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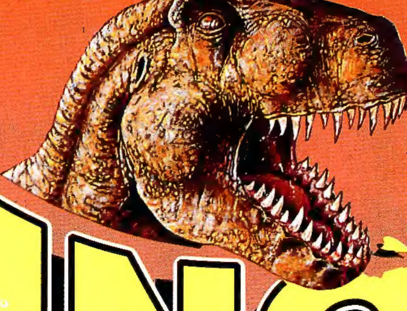

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TALARURUS

***Talarurus* carried as much armour as a medieval knight.**

Talarurus was an ankylosaur, like *Euplocephalus,* which lived in North America. It was found in Bayn Shireh in southern Mongolia in the early 1950s. Its well-preserved skull and skeleton show that *Talarurus* had an amazing set of armour to protect it from its enemies.

FLEXIBLE BANDS

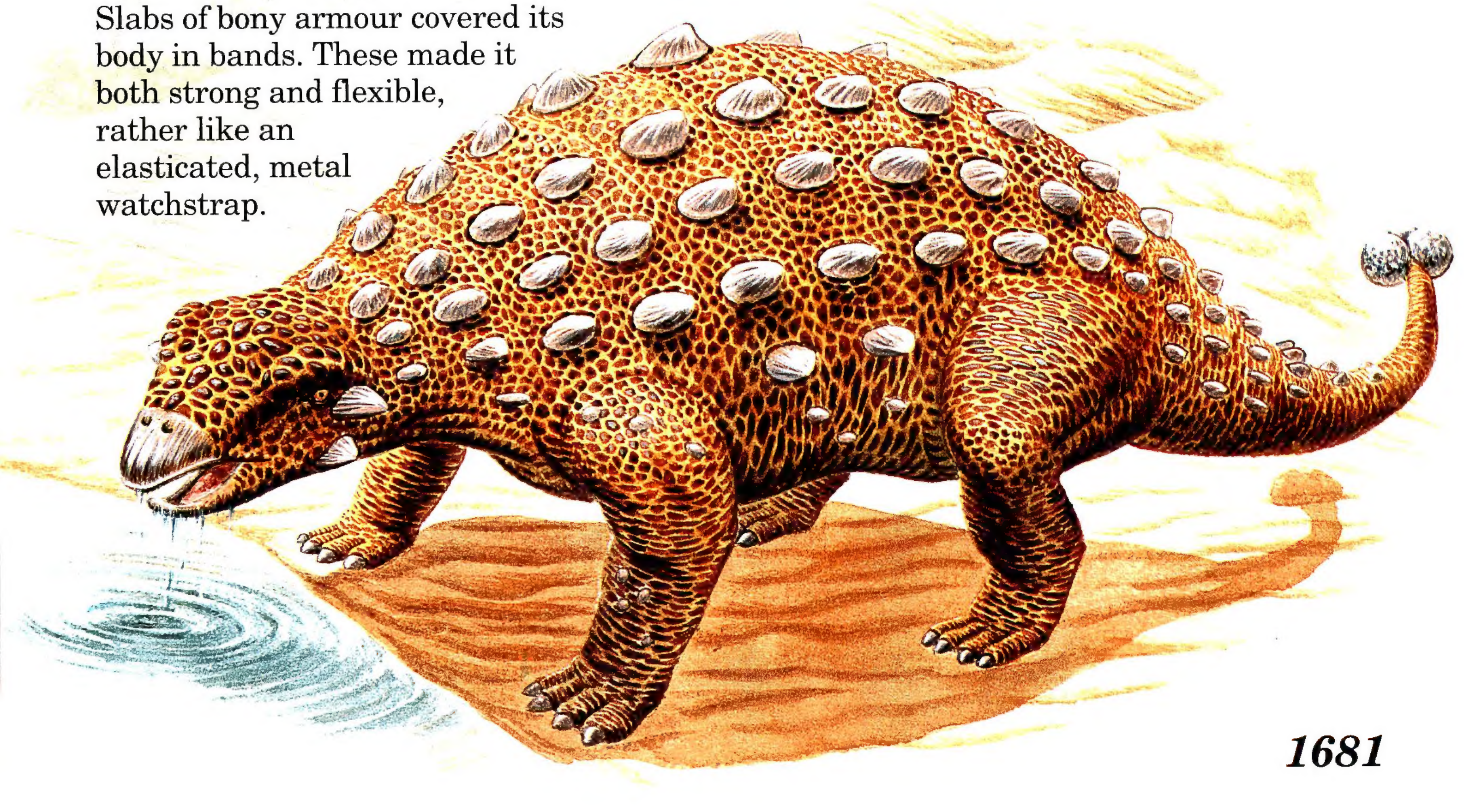
Because it lived alongside fierce flesh-eaters such as *Tarbosaurus* and speedy *Velociraptor*, *Talarurus* needed to be very well-protected against predators.
Like an armoured tank with legs, *Talarurus* was longer than two small cars. Slabs of bony armour covered its body in bands. These made it both strong and flexible, rather like an elasticated, metal watchstrap.

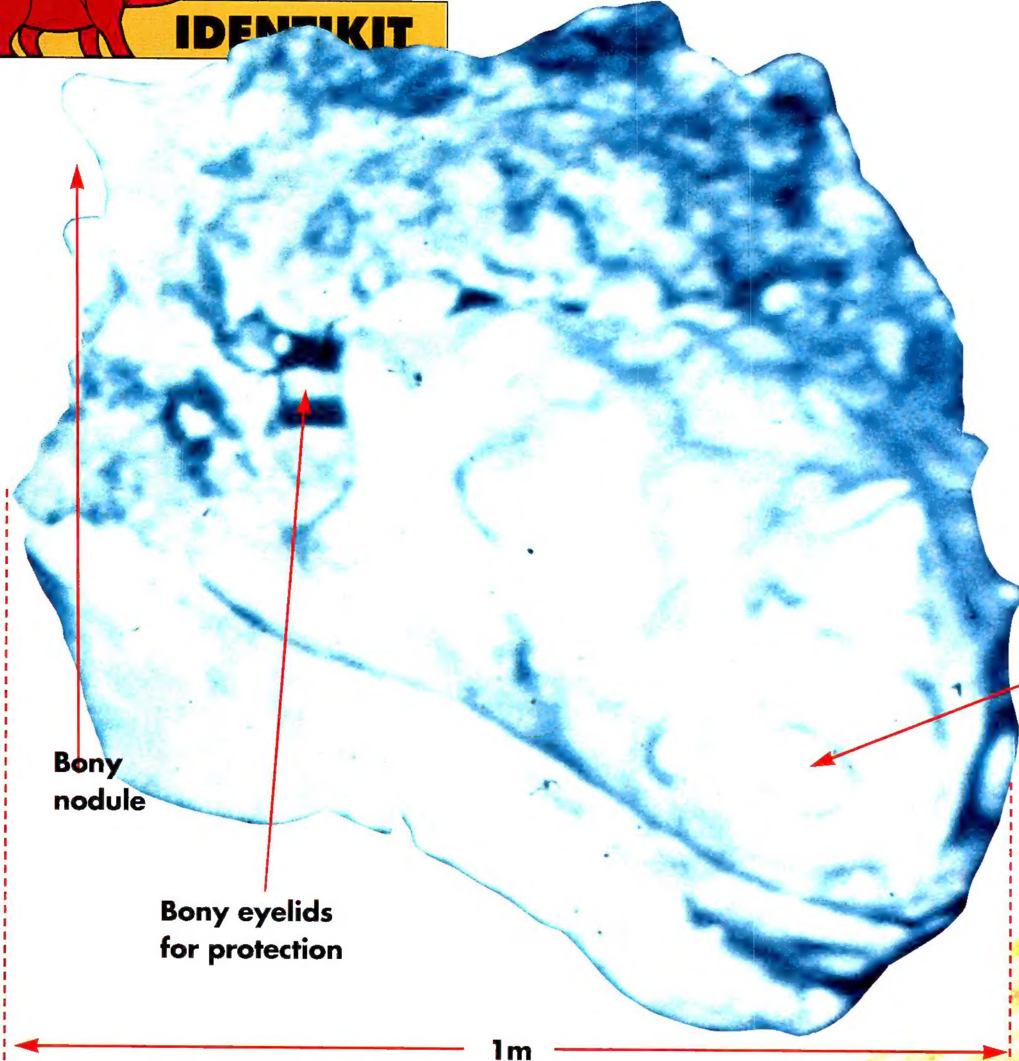
LOW DOWN

With its small head bent low, *Talarurus* nosed its way through the vegetation of Cretaceous Mongolia. It fed on low-growing plants and shrubs, and nipped off shoots with its broad, toothless beak. Inside its jaw, small, feeble teeth mashed the food, but all the heavy-duty, crushing work was done inside the dinosaur's muscular stomach.

MIGHTY MUSCLES

Talarurus' squat, heavy body was supported by four powerful legs. These were attached to the dinosaur's shoulders and hips by strong muscles, which helped *Talarurus* to move quite nimbly for a creature of its size.





The skull of *Talarurus* was heavily armoured with bony nodules and plates. Its body was heavily armoured too.

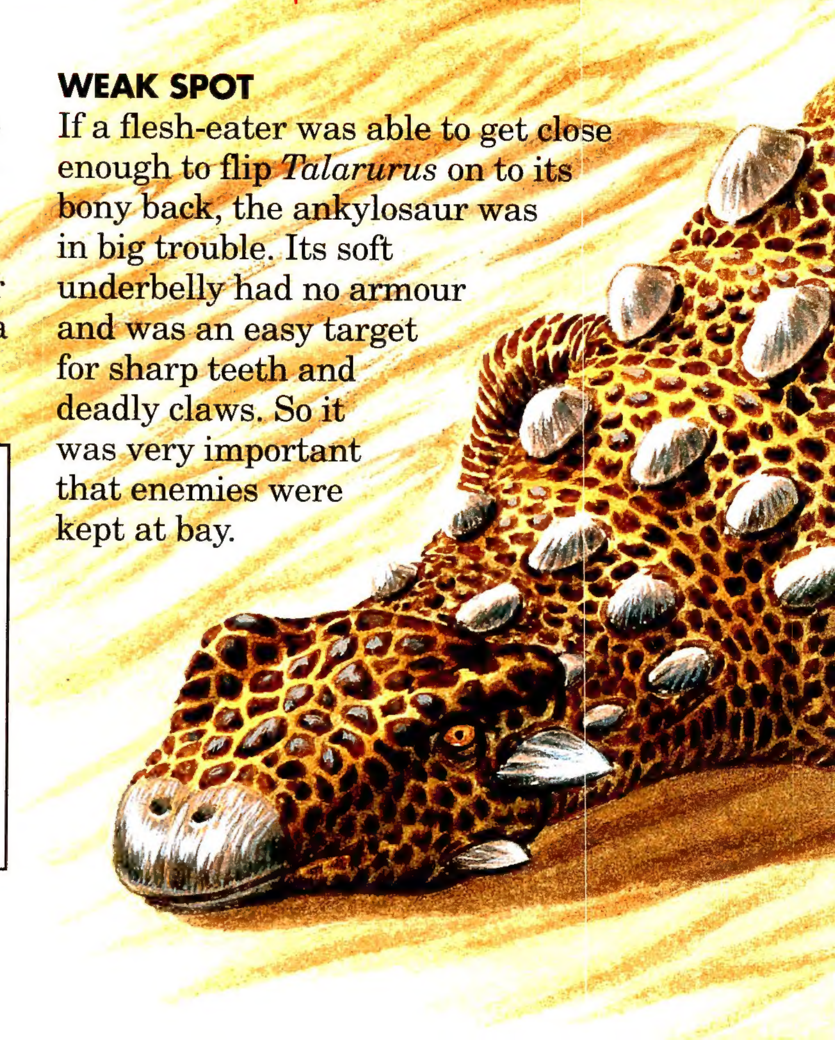
***Talarurus'* nostril. This ankylosaur had a very good sense of smell.**

EARLY WARNING

As it stood feeding peacefully, a good sense of smell probably helped to give *Talarurus* early warning that a predator was on its way. From the top of its head to the tip of its tail, *Talarurus* had a covering of armour and hollow spikes. But it was possible for a determined hunter to find its weak spot.

WEAK SPOT

If a flesh-eater was able to get close enough to flip *Talarurus* on to its bony back, the ankylosaur was in big trouble. Its soft underbelly had no armour and was an easy target for sharp teeth and deadly claws. So it was very important that enemies were kept at bay.

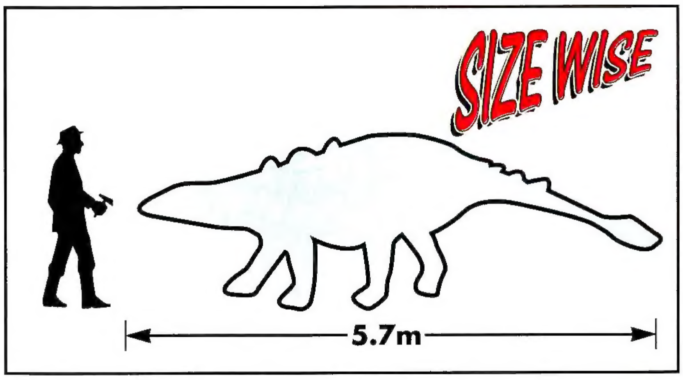


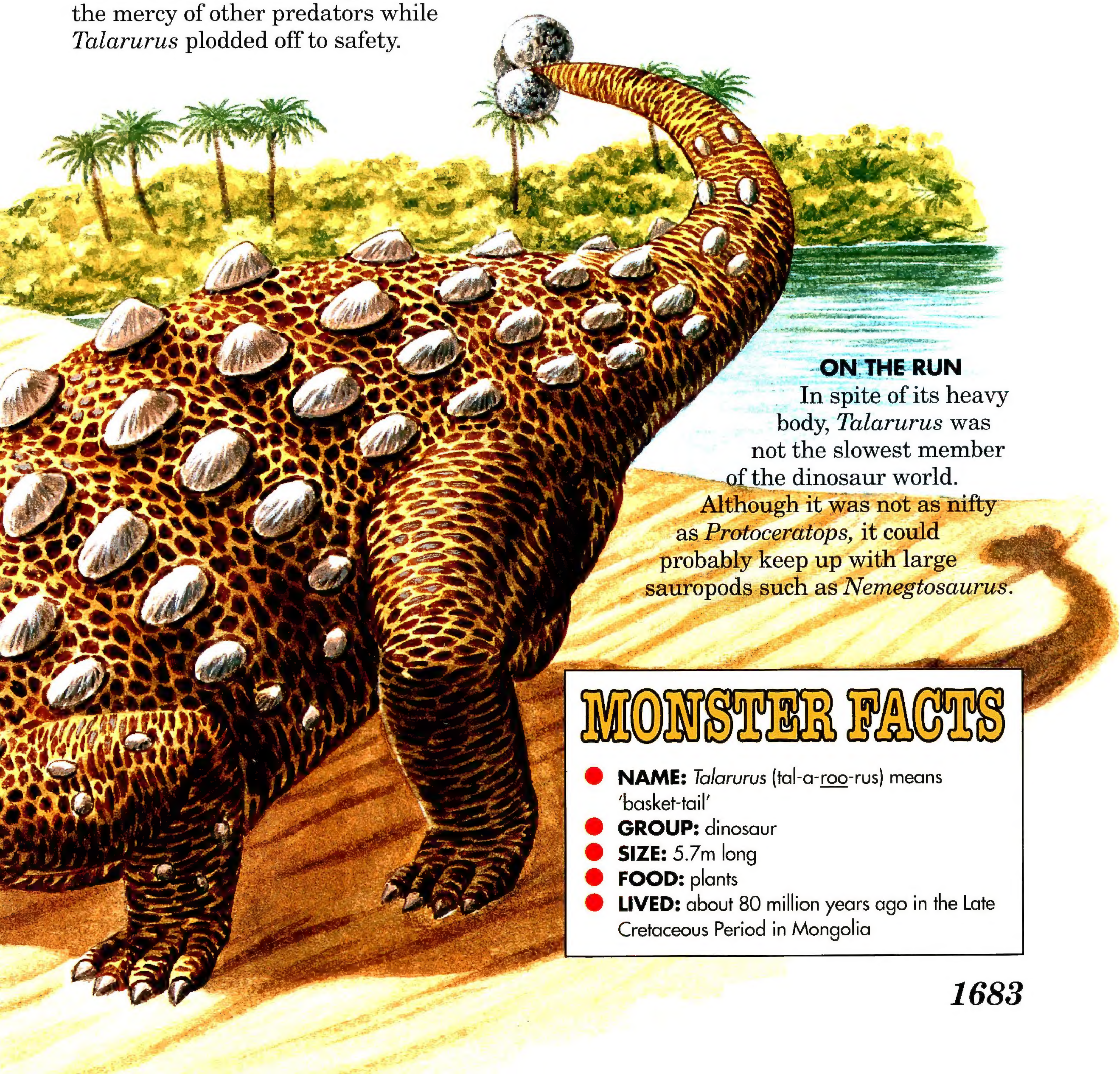
Is it true that *Talarurus* had a basket-shaped tail?

No. Although its name means 'basket-tail', it was actually the bones in *Talarurus*' hips that were shaped like a basket. On either side of its spine, the dinosaur's ribs were attached to shelf-like hip bones. Powerful muscles attached to the hips helped *Talarurus* to swing its tail and move its big hind legs.

LEG BREAKER

Talarurus had another, very effective weapon that it used to repel predators more than twice its size. At the end of its tail there was a bony club that could be swung from side to side with great force. Even an enemy as big as *Tarbosaurus* could be toppled by a mighty blow from this weapon. With its leg broken, a *Tarbosaurus* would lie helplessly at the mercy of other predators while *Talarurus* plodded off to safety.





ON THE RUN

In spite of its heavy body, *Talarurus* was not the slowest member of the dinosaur world. Although it was not as nifty as *Protoceratops*, it could probably keep up with large sauropods such as *Nemegtosaurus*.

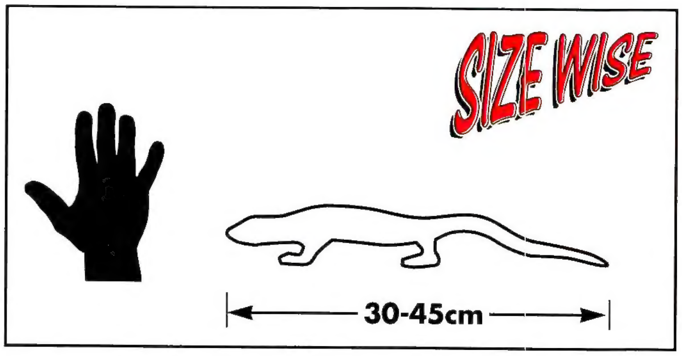
MONSTER FACTS

- **NAME:** *Talarurus* (tal-a-roo-rus) means 'basket-tail'
- **GROUP:** dinosaur
- **SIZE:** 5.7m long
- **FOOD:** plants
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in Mongolia

YOUNGINA

Youngina could bite through hard skin with its wide, sharp teeth.

Youngina was a reptile about as long as a rabbit is today. It roamed the desert-like regions of Permian southern Africa with reptiles such as *Moschops* and *Coelurosauravus*.



HAPPY ON LAND

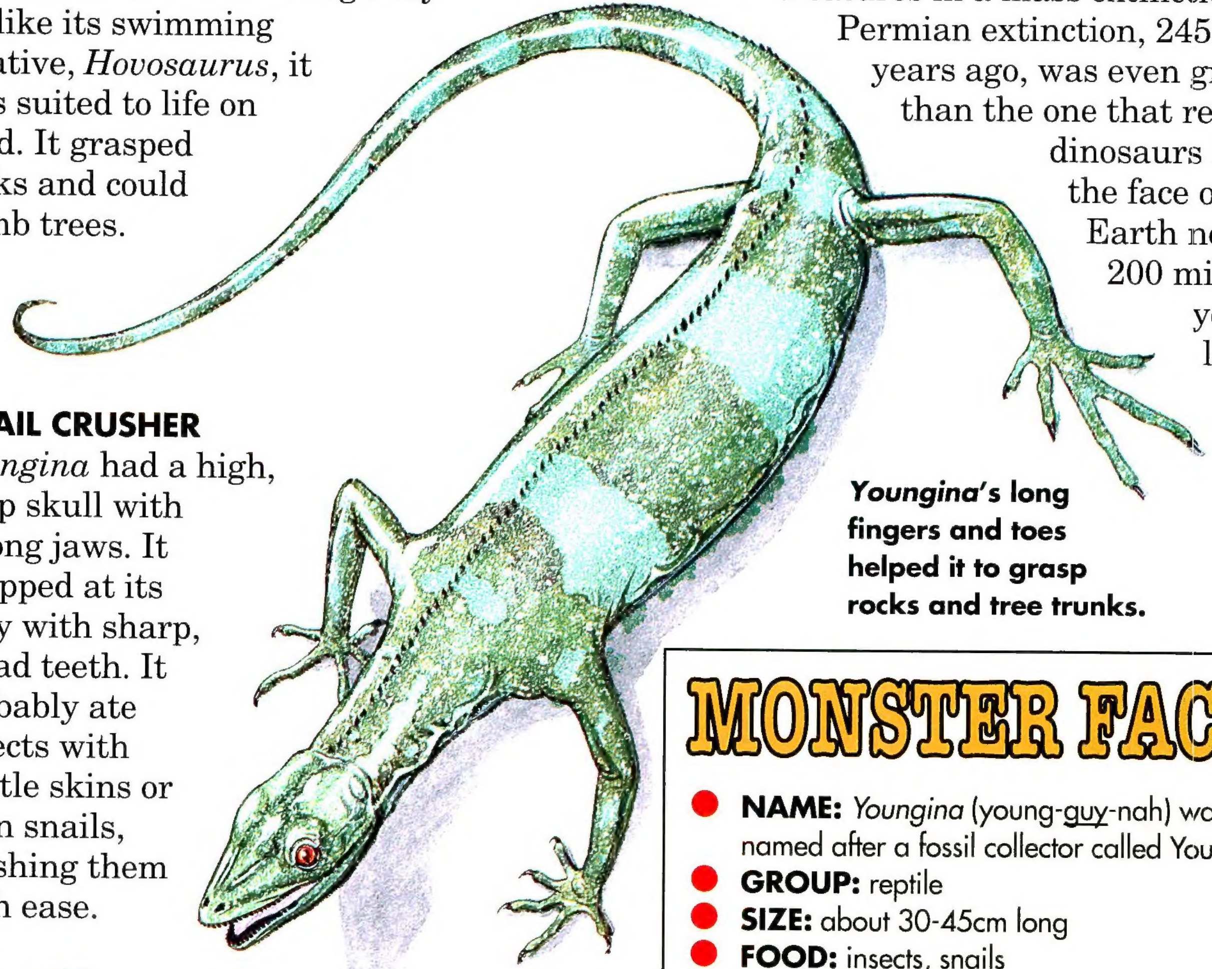
Youngina's limbs sprawled outwards on either side of its low-slung body. Unlike its swimming relative, *Hovosaurus*, it was suited to life on land. It grasped rocks and could climb trees.

SNAIL CRUSHER

Youngina had a high, deep skull with strong jaws. It snapped at its prey with sharp, broad teeth. It probably ate insects with brittle skins or even snails, crushing them with ease.

MASS EXTINCTION

At the end of the Permian, *Youngina* disappeared together with many other creatures in a mass extinction. The Permian extinction, 245 million years ago, was even greater than the one that removed dinosaurs from the face of the Earth nearly 200 million years later.



***Youngina*'s long fingers and toes helped it to grasp rocks and tree trunks.**

MONSTER FACTS

- **NAME:** *Youngina* (young-guy-nah) was named after a fossil collector called Young
- **GROUP:** reptile
- **SIZE:** about 30-45cm long
- **FOOD:** insects, snails
- **LIVED:** about 260 million years ago in the Permian Period in southern Africa

GERANOSAURUS

All that remained of this unusual dinosaur were its jaws and a few teeth.

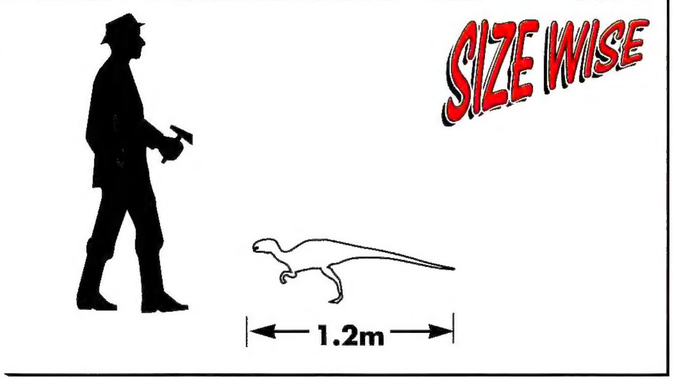
Geranosaurus was a close relative of *Heterodontosaurus*. It was as long as a large dog and knee-high to an adult human. When its jaws were found in South Africa, early this century, experts knew it was unusual.

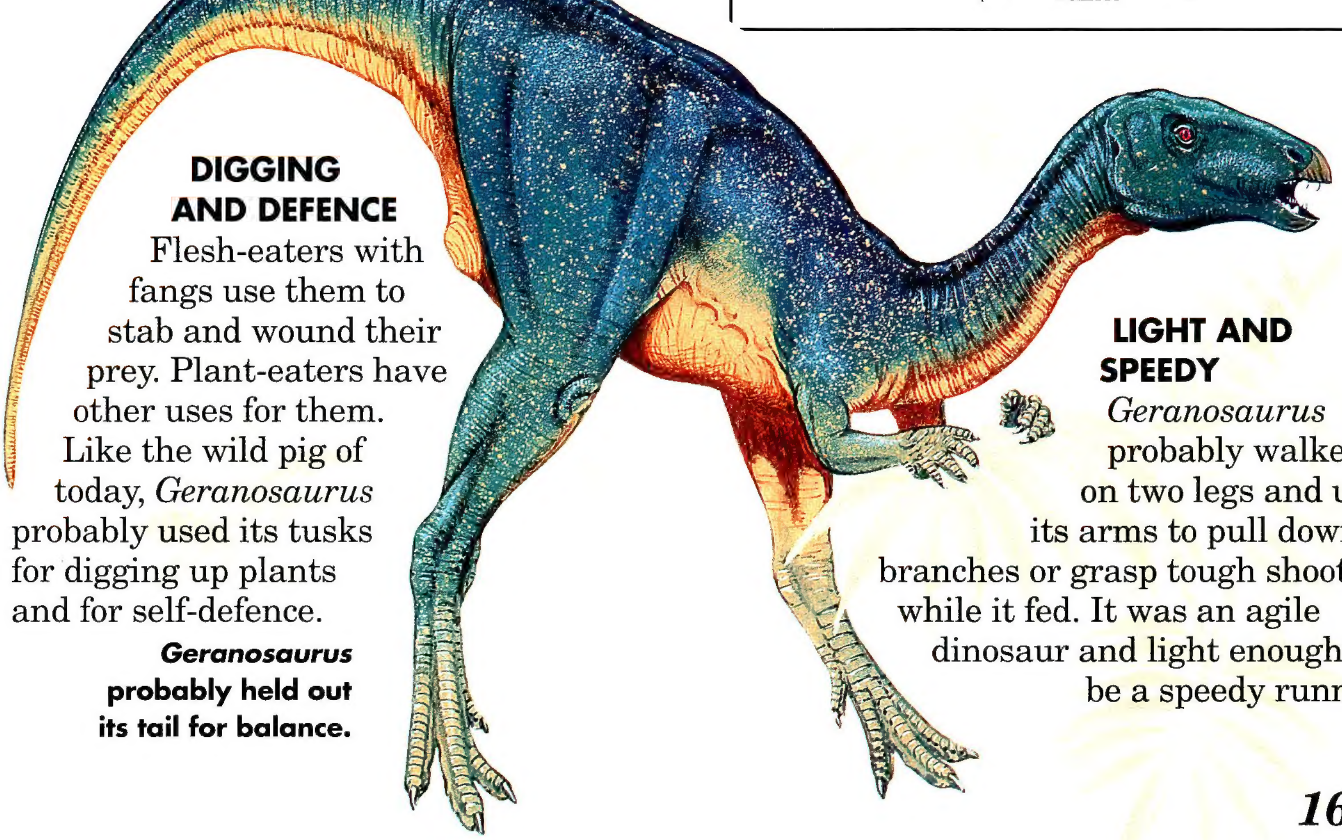
MONSTER FACTS

- **NAME:** *Geranosaurus* (jer-an-oh-saw-rus) means 'crane reptile'
- **GROUP:** dinosaur
- **SIZE:** up to 1.2m long
- **FOOD:** plants
- **LIVED:** about 200 million years ago in the Early Jurassic Period in Cape Province, South Africa

DIFFERENT TEETH

Geranosaurus belonged to the group called the heterodontosaurids. It had three different kinds of teeth. At the front of its jaw, the teeth were small and sharp for nipping off leaves. At the back, they were ridged for grinding. Lastly, there were a pair of short fangs.





DIGGING AND DEFENCE

Flesh-eaters with fangs use them to stab and wound their prey. Plant-eaters have other uses for them. Like the wild pig of today, *Geranosaurus* probably used its tusks for digging up plants and for self-defence.

LIGHT AND SPEEDY

Geranosaurus probably walked on two legs and used its arms to pull down branches or grasp tough shoots while it fed. It was an agile dinosaur and light enough to be a speedy runner.

***Geranosaurus* probably held out its tail for balance.**

Mammals, birds and flowers

When the dinosaurs died out, the mammals became the most important animals. This was the Tertiary Period and it lasted 64 million years.

If you could have flown around the world during the Tertiary Period it would have looked a lot like it does today. During the Tertiary the continents began to drift towards the positions they are in today. The landscape began to resemble the Earth we see today – flowering plants began to appear and mammals and birds moved to places once occupied by the dinosaurs.

POLAR JUNGLES

During the Tertiary the continents continued to move. This changed the climate. For the first 20 million years, the weather became warmer. There were even steamy jungles in the far north and south, near the poles. Early mammals and birds flourished in the damp, warm climate.

What is? THE TERTIARY

Tertiary means 'third age'. It is the third of the three distinct ages: Primary (most ancient), Secondary (next most ancient), Tertiary (third age). The Tertiary began when the dinosaurs died out, 66 MYA. It ended 2 MYA. The Tertiary Period is divided into five main Epochs:

Palaeocene 66–56 MYA
Eocene 56–35 MYA
Oligocene 35–23 MYA
Miocene 23–6 MYA
Pliocene 6–2 MYA

MYA = Million years ago

COOLING WATERS

The oceans cooled around the poles and ice sheets formed. The climate became more extreme. Many of the early mammals and birds disappeared, but ancestors of today's animals, such as the dog, were seen for the first time.

IN NORTH AMERICA

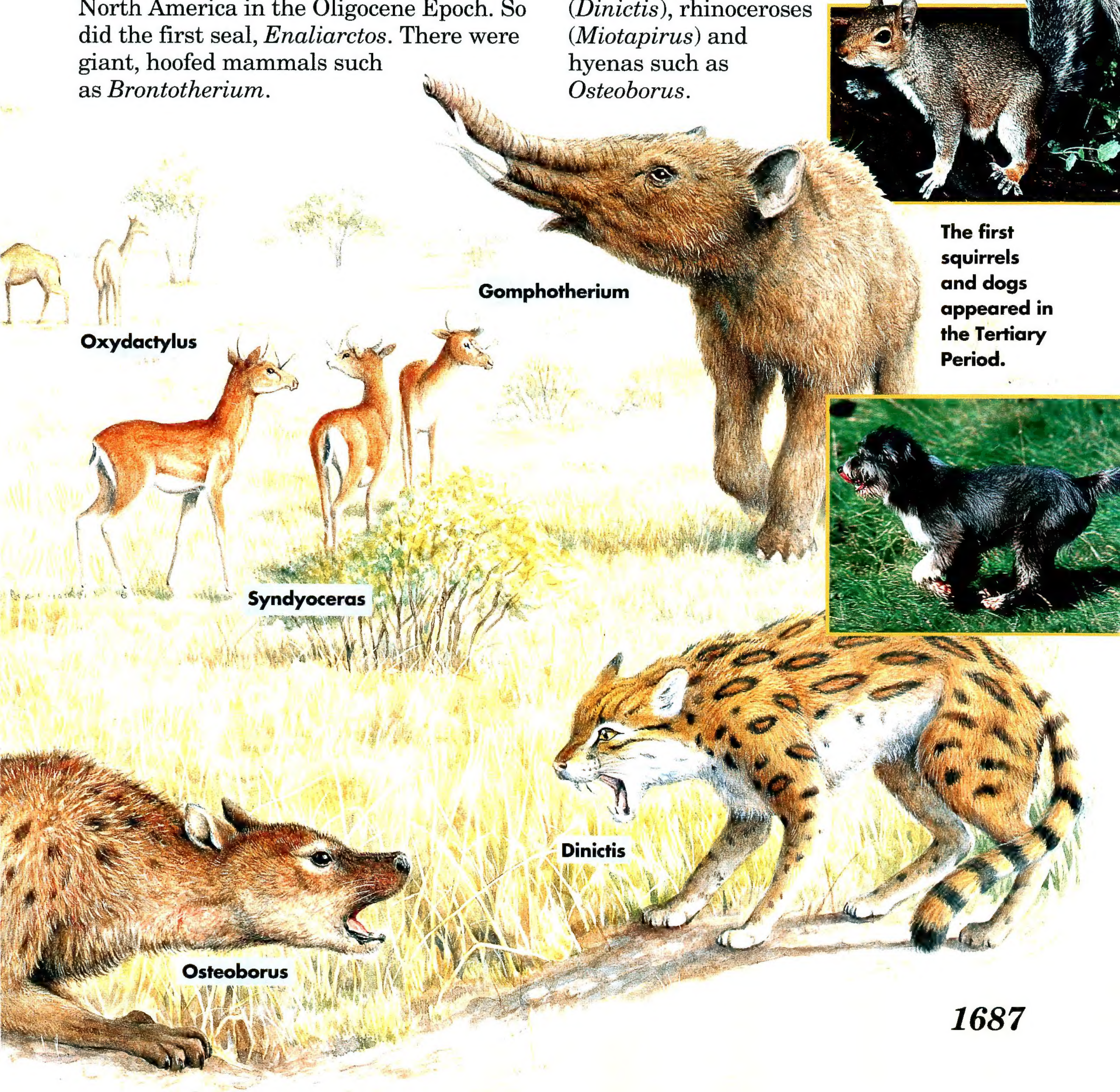
North America was the birthplace of the pouched mammals, some very early plant-eaters, the multituberculates, such as *Ptilodus*, and the first rodents such as squirrel-shaped *Ischyromys*.

DOGS AND SEALS

The first dog, *Hesperocyon*, appeared in North America in the Oligocene Epoch. So did the first seal, *Enaliarctos*. There were giant, hoofed mammals such as *Brontotherium*.

MIOCENE ZOO

In the Miocene Epoch, the American prairies looked like today's African savannahs. There were elephants (*Gomphotherium*), pronghorns (*Merycodus*), deer-like *Syndyoceras*, giant pigs, the giant, clawed horse *Moropus*, camels (*Oxydactylus*), sabre-tooth ancestors (*Dinictis*), rhinoceroses (*Miotapirus*) and hyenas such as *Osteoborus*.



The first squirrels and dogs appeared in the Tertiary Period.

COMING AND GOING

About two million years ago, North and South America joined at the Isthmus of Panama. Animals evolved, spread, migrated and died out. The giant, flightless, meat-eating bird *Titanis* went north, along with capybaras, armadillos, giant ground sloths, opossums and porcupines. Many South American marsupials such as *Cladosictis* (an otter with a pouch), *Borhyena* (a marsupial bear) and *Thylacosmilus* (a marsupial lion) died out completely.

OLIGOCENE ZOO

In Oligocene Asia there were rhinoceroses which came in all shapes and sizes, such as the giant *Indricotherium* and the tiny *Hyracodon*. Asia also boasted the giant, horse-relative *Embolotherium,* the early pig *Archaeotherium*, and the sabre-toothed cat *Nimravus*.

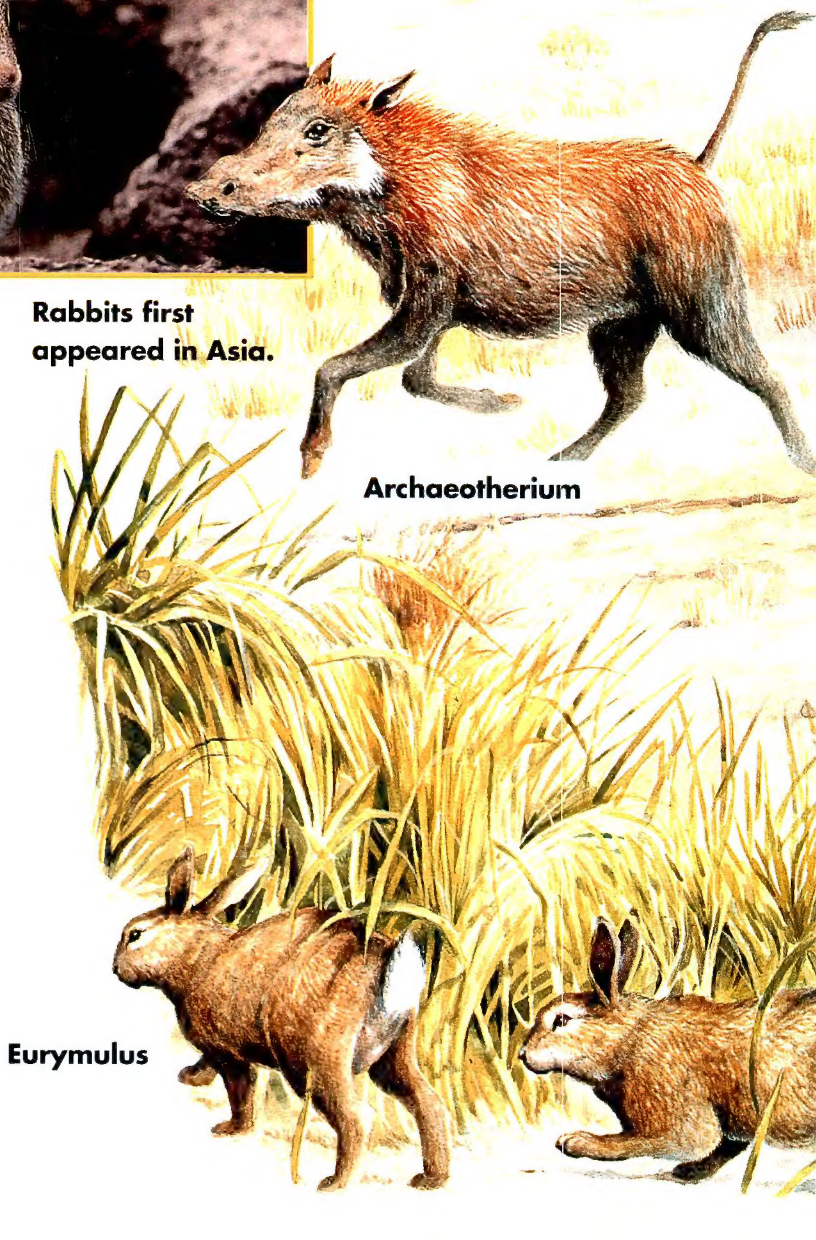
ANIMAL CROSSROADS

At various times, Europe was joined to North America, Asia and Africa. Europe was the crossroads for lots of different forms of animal life. It may have been home to the earliest mammal carnivores. *Miacis* looked like a stoat or weasel and lived 55 million years ago in Germany. Europe also had an early member of the primate group, made up of lemurs, monkeys and apes, called *Necrolemur*. It was about 25cm long and looked like the modern bushbaby.

Rabbits first appeared in Asia.

FIRST STEPS IN ASIA

During the Oligocene Epoch, India collided with Asia and the Himalayan Mountains were formed. Several animals made their entry into life on Earth in Asia. Rabbits evolved in Asia. One of the first was *Eurymulus* from Mongolia. Asian fossils also show the first whale (*Pakicetus*), the first elephant (*Moeritherium*) and perhaps the first bats. In the Miocene, the first proper bear, *Hemicyon,* evolved.



Whales first appeared in the Tertiary Period.

MYSTERIOUS AFRICA

During the Oligocene in Africa, the tropical forests thinned out. Marsupials and rodents arrived from Asia. The great apes such as *Propliopithecus* evolved. During the Miocene, Africa joined to Europe and Asia. Grasslands spread and rabbits, cats, rhinos, carnivores, insectivores, pigs and deer poured in. The first giraffe was the horned *Prolibytherium*. Grazing animals flourished, along with their predators such as the hyena *Ictitherium*.

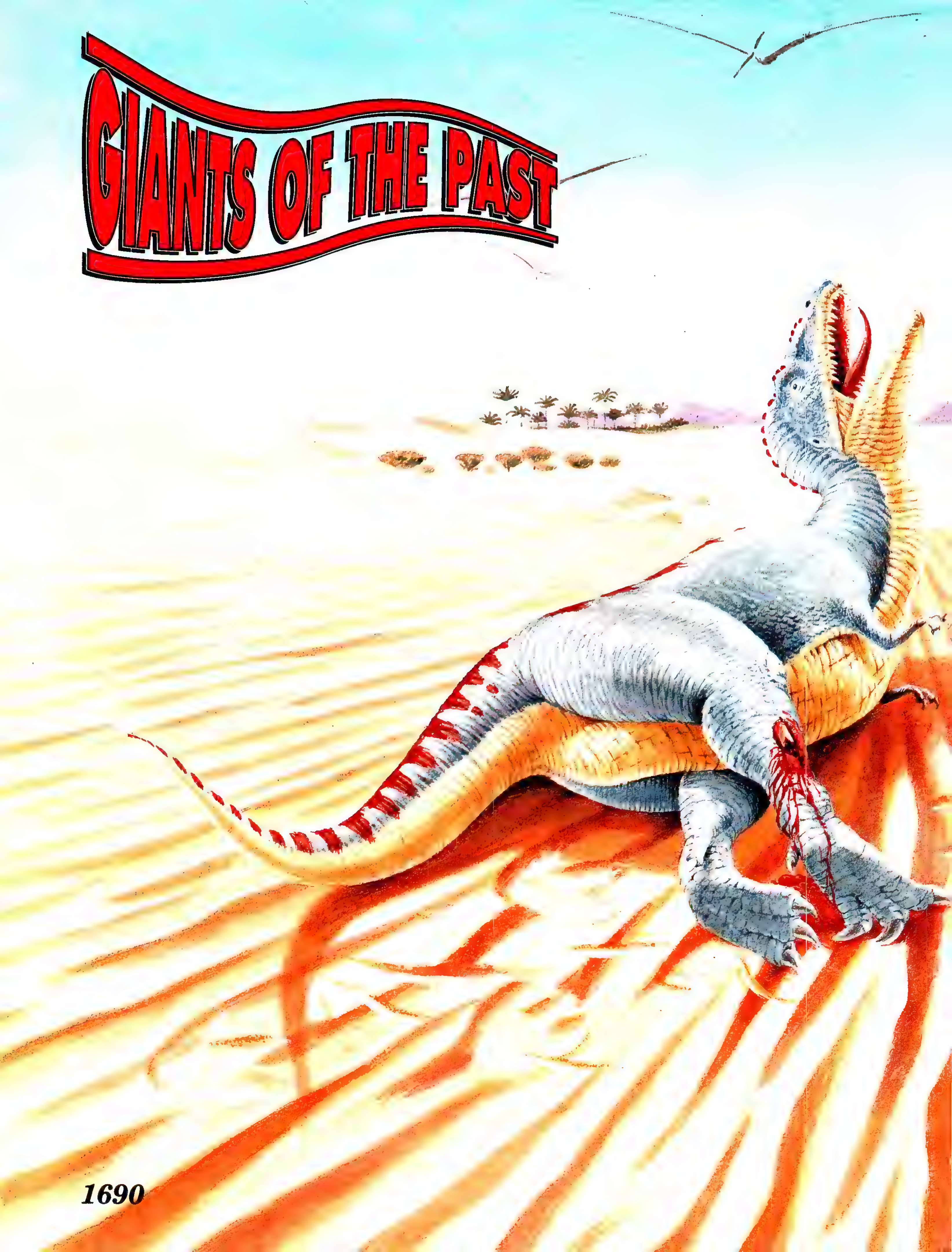
DOWN UNDER

In the Oligocene, Australia became an island continent and its marsupials did very well. The egg-laying mammals survived there. Now there are only two kinds – the platypus and echidna. In splendid isolation there were prehistoric possums, bandicoots, huge kangaroos such as *Procoptodon*, together with more primitive giant marsupials such as the horse-sized wombat *Diprotodon* and the marsupial lion *Thylacoleo*.

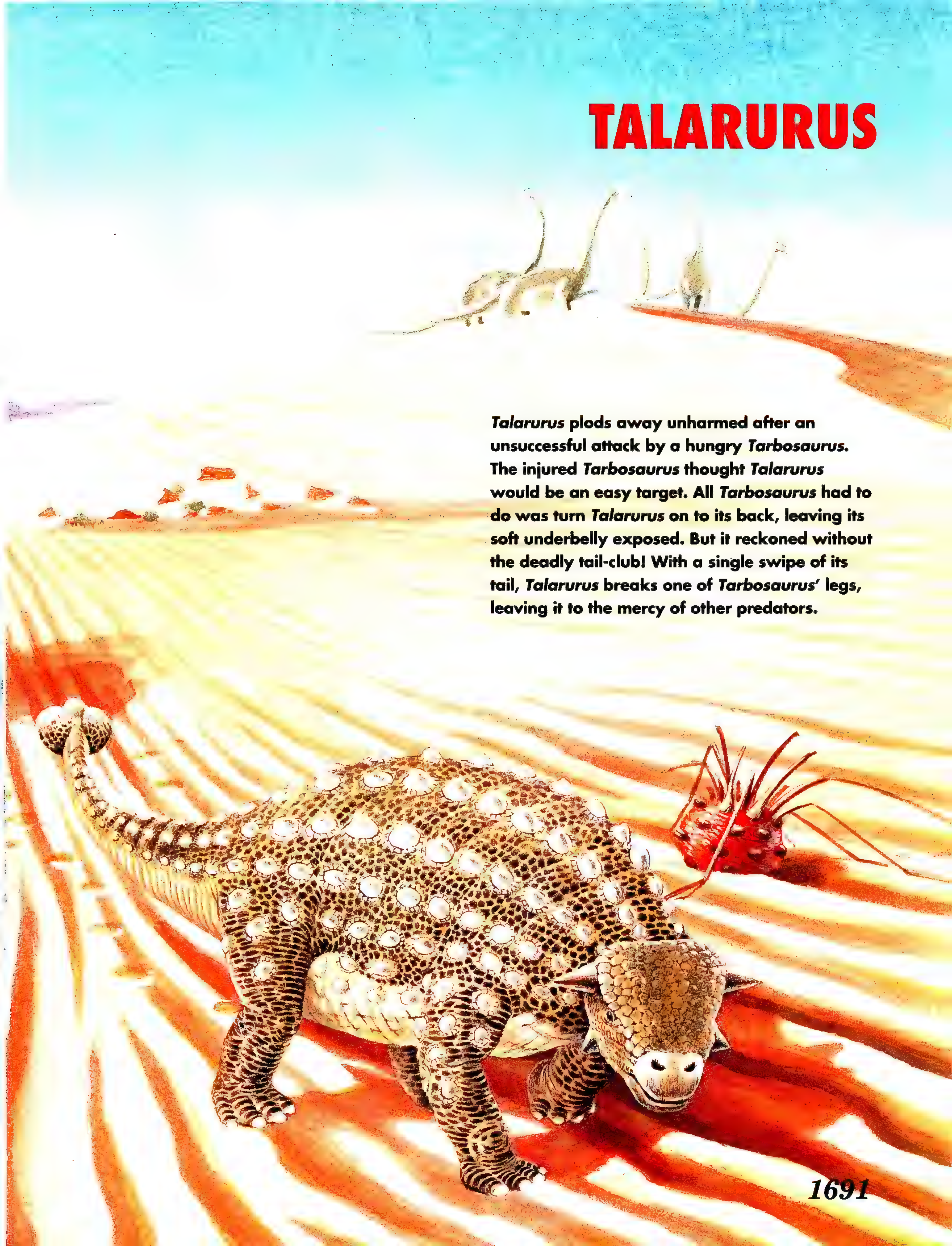
Is it true that young fossils are more common than old ones?

Yes. Fossils take many thousands of years to form. But even as they are being made, they are at risk of destruction. They may get pressed down and melted into the molten rocks deep below. They may come to the surface and get worn away by wind, ice and rain. So older fossils have a longer time to disappear. Tertiary fossils stand a better chance of survival than fossils from the Age of Dinosaurs.

GIANTS OF THE PAST



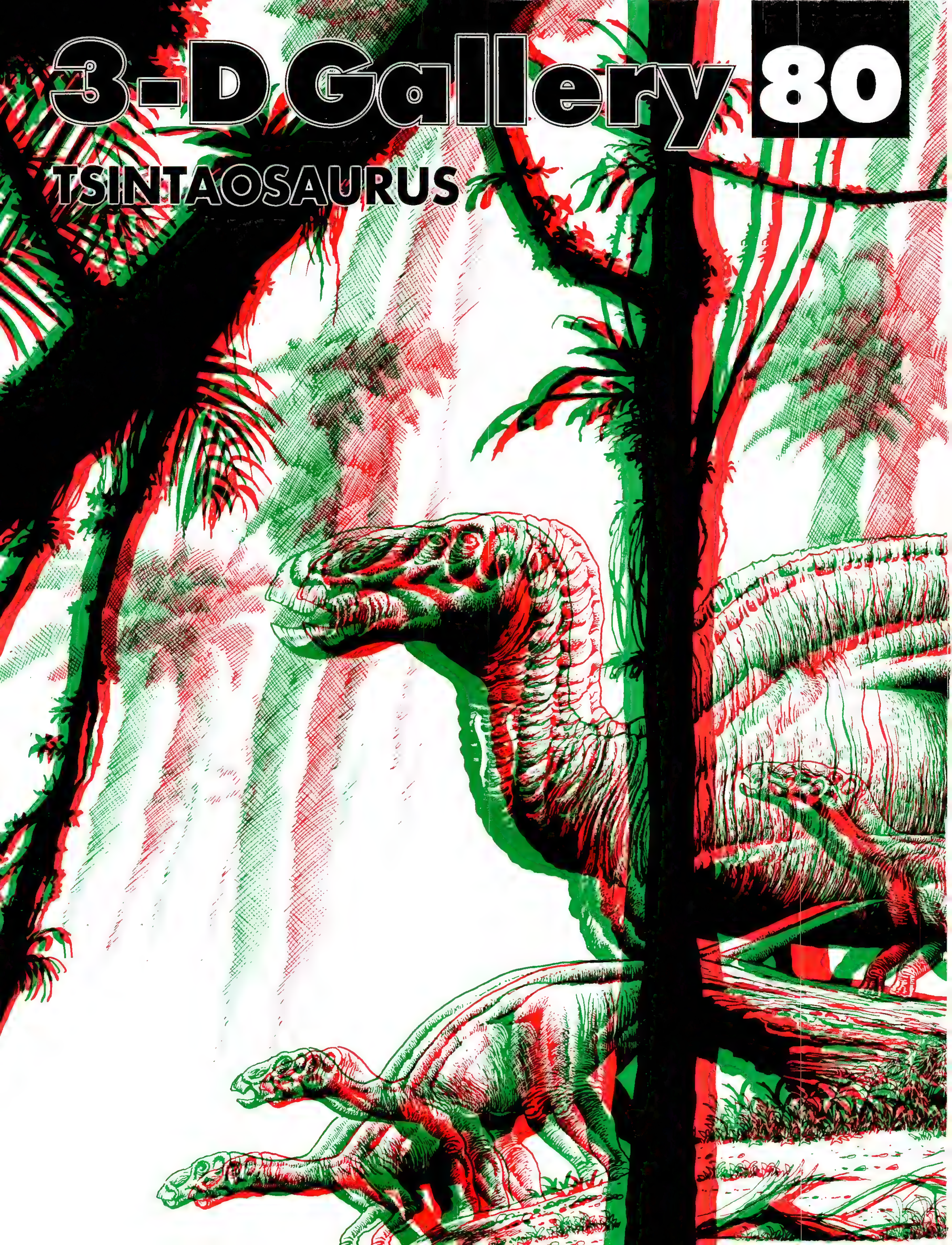
TALARURUS



Talarurus plods away unharmed after an unsuccessful attack by a hungry *Tarbosaurus.* The injured *Tarbosaurus* thought *Talarurus* would be an easy target. All *Tarbosaurus* had to do was turn *Talarurus* on to its back, leaving its soft underbelly exposed. But it reckoned without the deadly tail-club! With a single swipe of its tail, *Talarurus* breaks one of *Tarbosaurus'* legs, leaving it to the mercy of other predators.

3-D Gallery 80

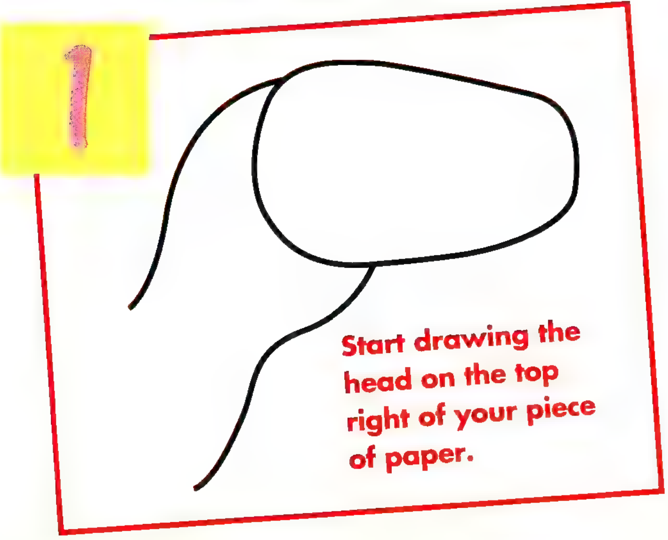
TSINTAOSAURUS



An adult *Tsintaosaurus* leads her calves through the mists of the early morning, along a river path in the forests of Late Cretaceous China. This family of duckbilled dinosaurs is hungry, and will enjoy its breakfast of foliage, conifer needles and tree bark.

How to draw T rex

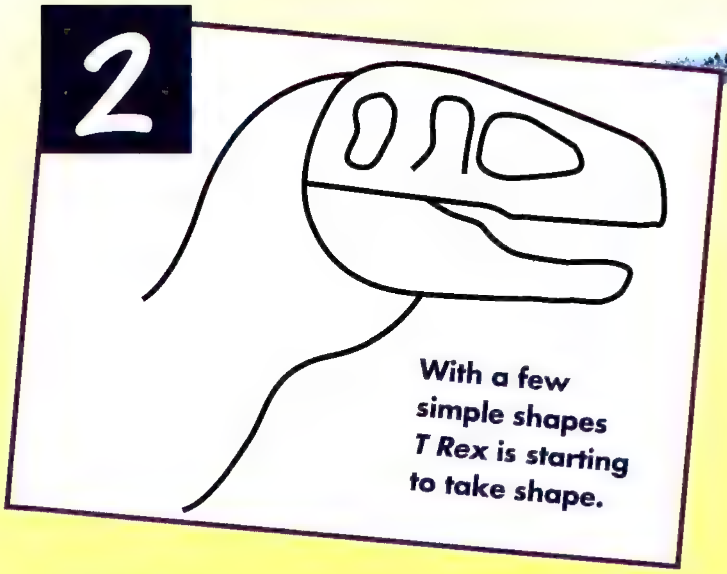
Discover how to draw the meanest of monsters marvellously.



Start drawing the head on the top right of your piece of paper.

1 THE HEAD

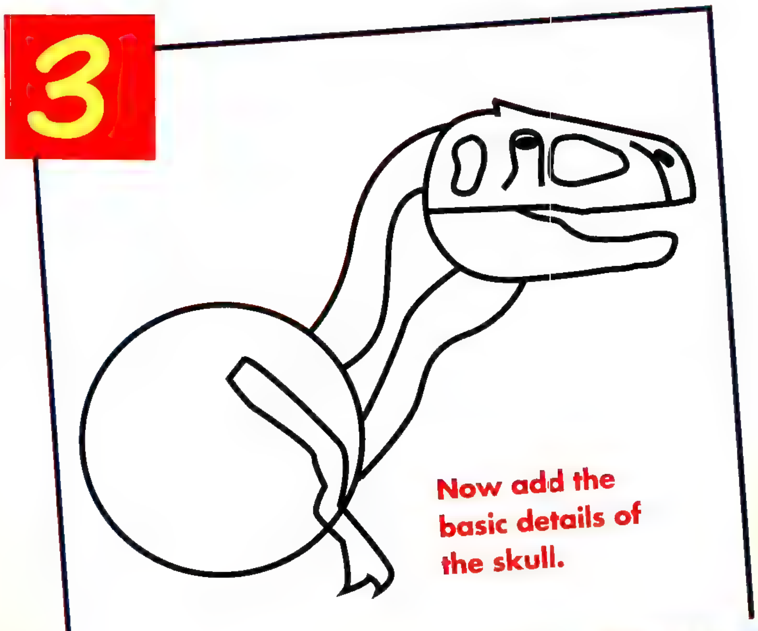
Start with an egg shape, pointed end forward. This will be the head. The neck is shaped like a stretched letter 'S'.



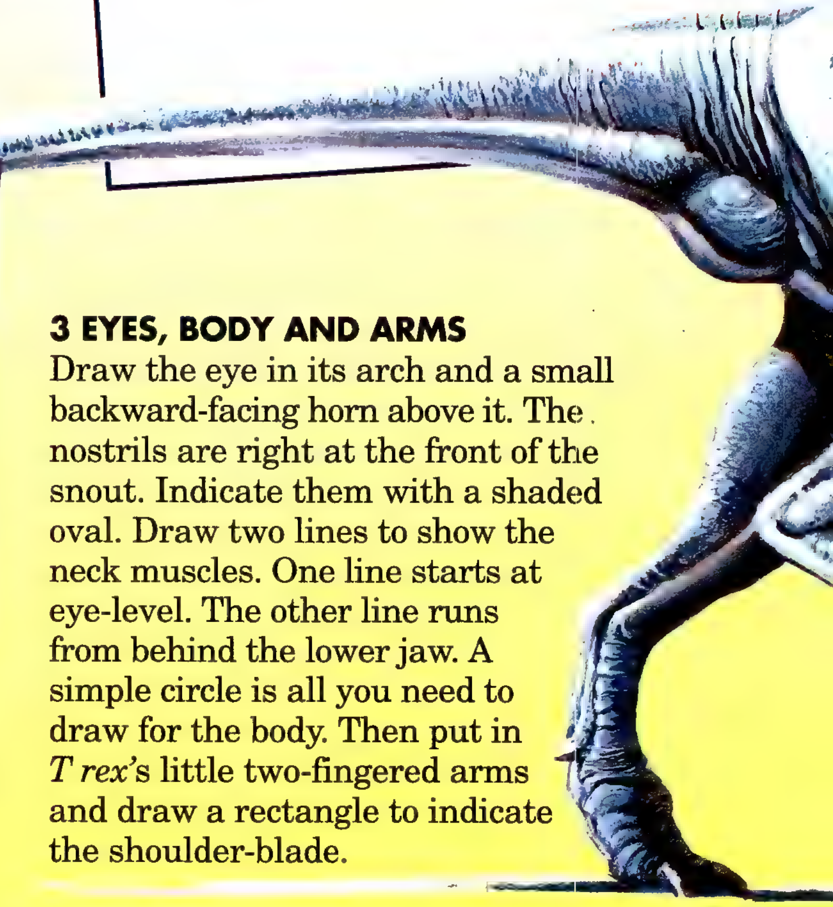
With a few simple shapes *T Rex* is starting to take shape.

2 THE SKULL

Draw in the line of the jaws and three openings in the skull. The back one is a bit like a keyhole and there is an arch for the eye. The front opening is wedge-shaped.



Now add the basic details of the skull.



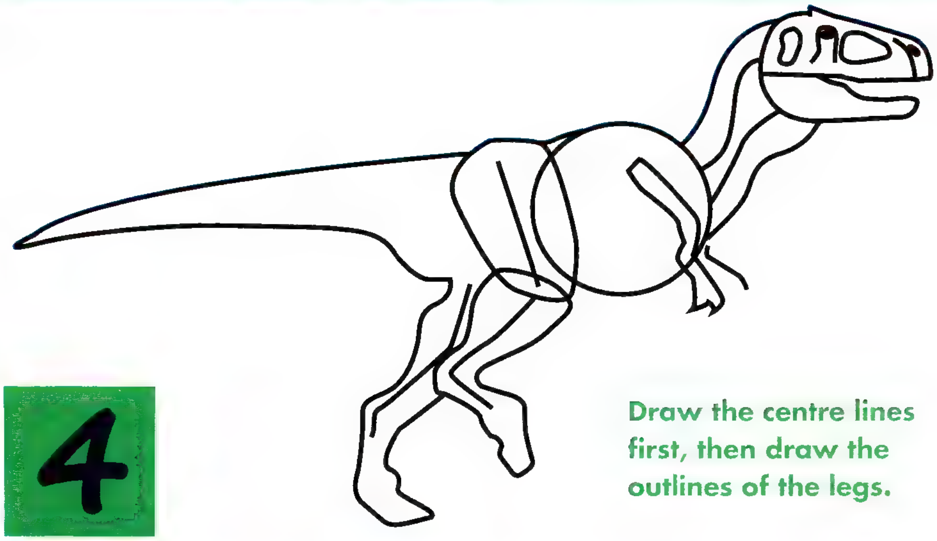
3 EYES, BODY AND ARMS

Draw the eye in its arch and a small backward-facing horn above it. The nostrils are right at the front of the snout. Indicate them with a shaded oval. Draw two lines to show the neck muscles. One line starts at eye-level. The other line runs from behind the lower jaw. A simple circle is all you need to draw for the body. Then put in *T rex*'s little two-fingered arms and draw a rectangle to indicate the shoulder-blade.

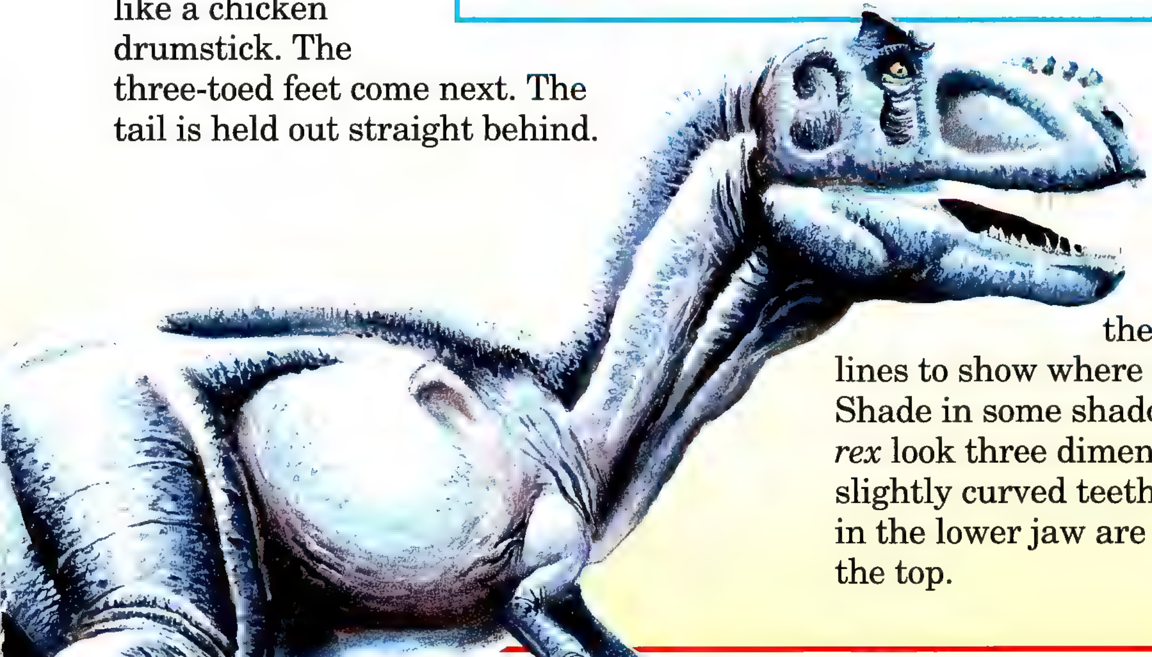
4 LEGS AND TAIL

To get each leg in the right position, draw the centre lines. These show the middle of each leg. Now draw in the leg shape: an egg shape, pointed end down, for the upper leg. Make sure it is directly behind the body. The lower leg is like a chicken drumstick. The three-toed feet come next. The tail is held out straight behind.

4



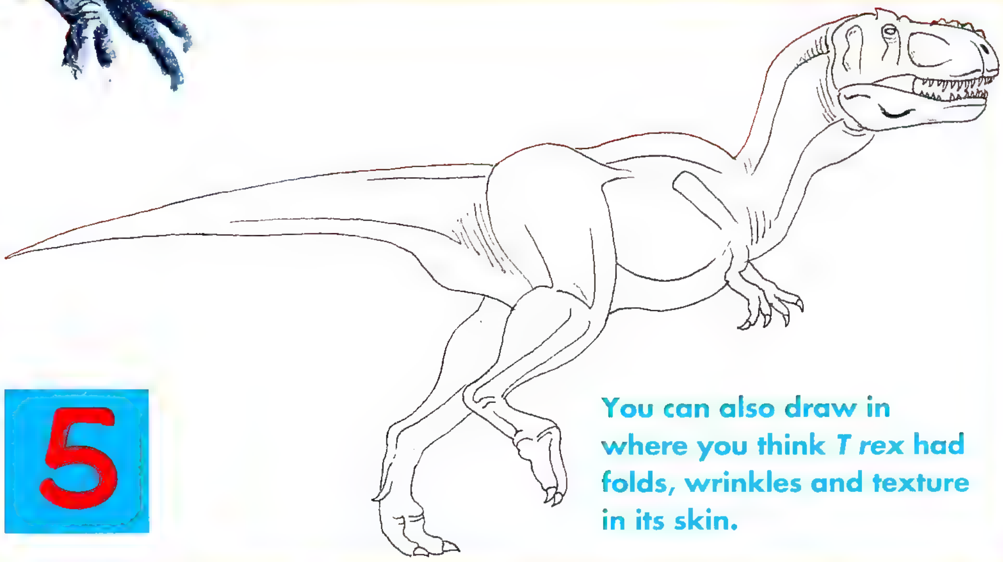
Draw the centre lines first, then draw the outlines of the legs.



5 FINISHING TOUCHES

Go over the outline to get a smooth, continuous shape. Add little bumps over the snout and put in lines to show where the muscles are. Shade in some shadows to make your *T rex* look three dimensional. Draw in the slightly curved teeth. Remember the teeth in the lower jaw are smaller than those in the top.

5



You can also draw in where you think *T rex* had folds, wrinkles and texture in its skin.

6

Now colour in your *T rex*. You don't have to follow these colours. You can colour your *T rex* however you like and even add stripes or spots if you want to!

Portrait of a king

Since 1990, experts have discovered more about *T rex* than ever before.

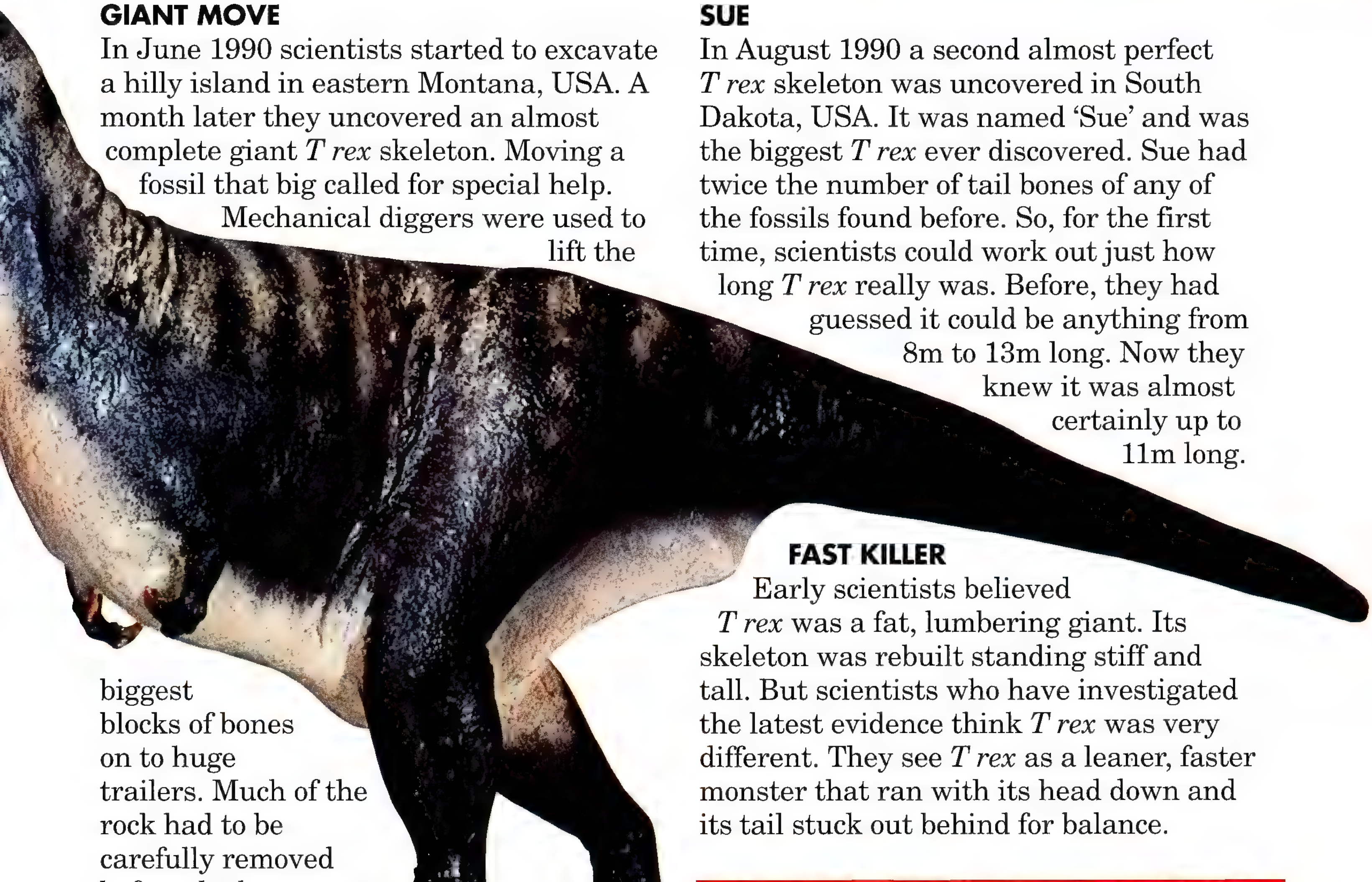
When a giant dinosaur was dug up in Wyoming, USA, in 1902, experts realised it was far bigger than any meat-eating land animal yet discovered. They decided to give it a 'giant' name – *Tyrannosaurus rex* – which means 'king of the tyrant reptiles'.

REX REBORN

Finding a *T rex* is a rare event. Only 11 fossil remains have been excavated since the turn of the century. But in just two months in 1990 two of the most complete skeletons ever found were unearthed.

Studies of those skeletons have proved that many of our ideas about the giant meat-eater were quite wrong. Now experts have built up an exciting new picture of the world's most popular dinosaur.

Experts used to think that *T rex* moved very slowly and stood upright on its back legs, like the model pictured here. But they now think it was fast and fit and leaned forward like the model pictured opposite.



GIANT MOVE

In June 1990 scientists started to excavate a hilly island in eastern Montana, USA. A month later they uncovered an almost complete giant *T rex* skeleton. Moving a fossil that big called for special help. Mechanical diggers were used to lift the biggest blocks of bones on to huge trailers. Much of the rock had to be carefully removed before the bones were light enough to be taken indoors.

SUE

In August 1990 a second almost perfect *T rex* skeleton was uncovered in South Dakota, USA. It was named 'Sue' and was the biggest *T rex* ever discovered. Sue had twice the number of tail bones of any of the fossils found before. So, for the first time, scientists could work out just how long *T rex* really was. Before, they had guessed it could be anything from 8m to 13m long. Now they knew it was almost certainly up to 11m long.

FAST KILLER

Early scientists believed *T rex* was a fat, lumbering giant. Its skeleton was rebuilt standing stiff and tall. But scientists who have investigated the latest evidence think *T rex* was very different. They see *T rex* as a leaner, faster monster that ran with its head down and its tail stuck out behind for balance.

Is it true that there are special dinosaur societies to join?

Yes. If you want to know more about *T rex* and all the other dinosaurs, you can join a dinosaur society. There is one in the UK. For details write to: The UK Dinosaur Society, c/o Valley View, Church Lane, Waltham, Canterbury, Kent CT4 5SS. There is another in the USA. To find out more write to: The Dinosaur Society, 200 Carleton Avenue, East Islip, NY 11730, USA.

In 1990 scientists found two *T rex* in the USA.

***T rex* used its big teeth for biting through bones and skin.**

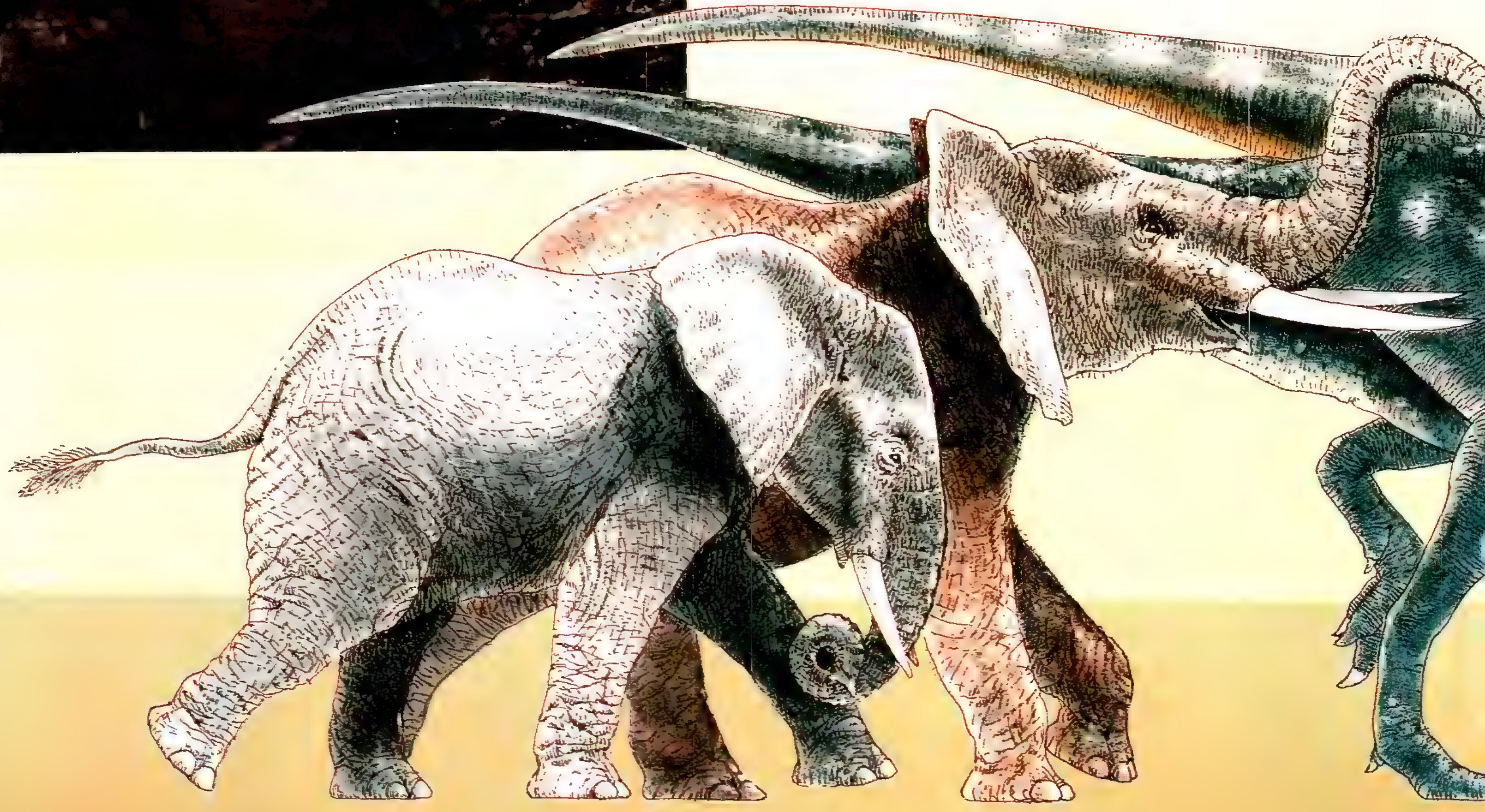
SHREDDING AND CHOMPING

The main weapon *T rex* possessed was a huge mouth, full of enormous teeth. Some experts now think it had two ways of tearing up its food. It used its strongest teeth to chomp through skin and bone and its smaller ones to shred the flesh into bits.

EASY MEAT

Was *T rex* a ferocious killer? Some experts think that *T rex* might have found it easier to prey on dead or dying animals. Like today's hyena, it might have been a part-time killer. It could have feasted on dead bodies that it sniffed out. But it could also have killed for its lunch if necessary.

***T rex* skull showing its deadly teeth**



HIS AND HERS

The *T rex* skeletons discovered so far are of two different types. Some, like Sue, are bigger. Others are smaller. Scientists have suggested that the difference could be because one was male and the other female. Experts believe the female *T rex* was the larger and stronger one.

ON THE BALL

T rex had a larger brain than the giant plant-eating dinosaurs. Experts also think it might have been able to see, hear and smell better than most animals of its time. The dinosaur's eyes pointed forwards, rather like ours do, so it might have seen the world in the same way we do. Big holes found in its skull might mean that it could hear very low sound, which would have helped it to track down its prey. Oval-shaped holes discovered on each side of its nose could be proof that the dinosaur had an extra-sharp sense of smell.

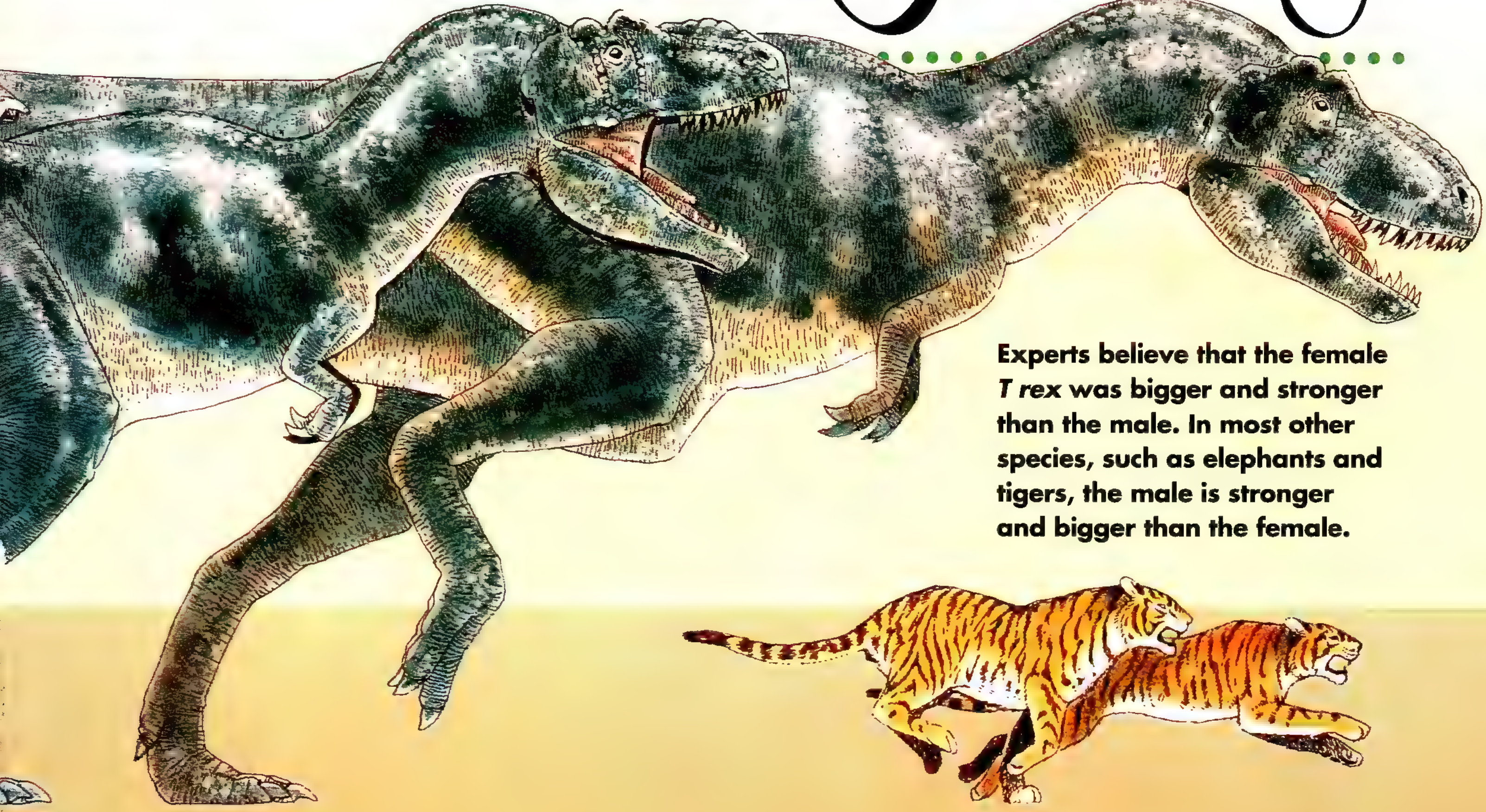
ROUGH AND TOUGH

Sue's bones showed a variety of scars from different kinds of injury. This has led experts to believe the dinosaur led a rough, tough life. There is a *T rex* tooth stuck in one rib and there are deep groove-like scratches in the pelvis. Both discoveries prove that Sue had fierce fights with other *T rex*.

IT'S A FACT

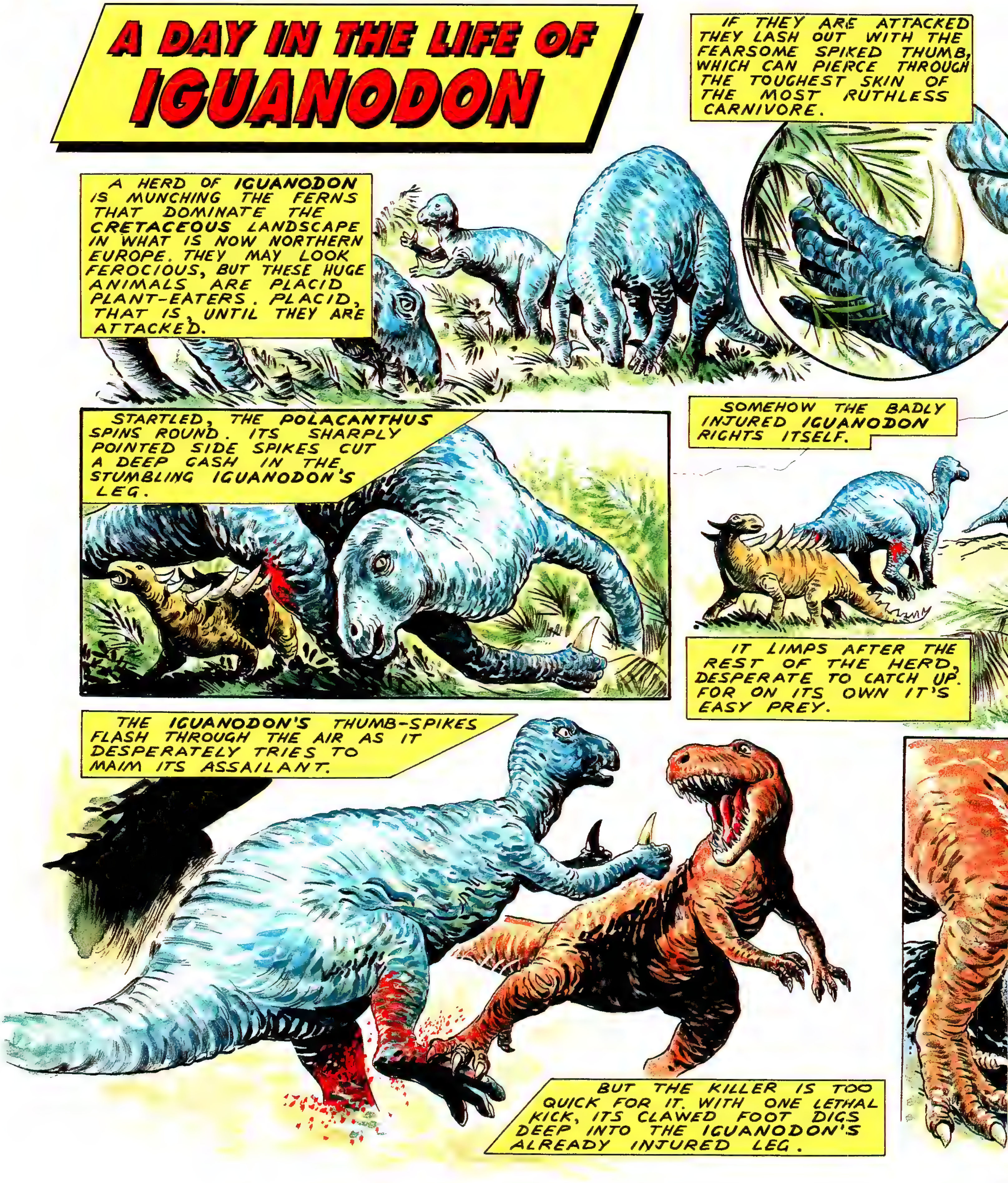
ELEPHANT EATER?

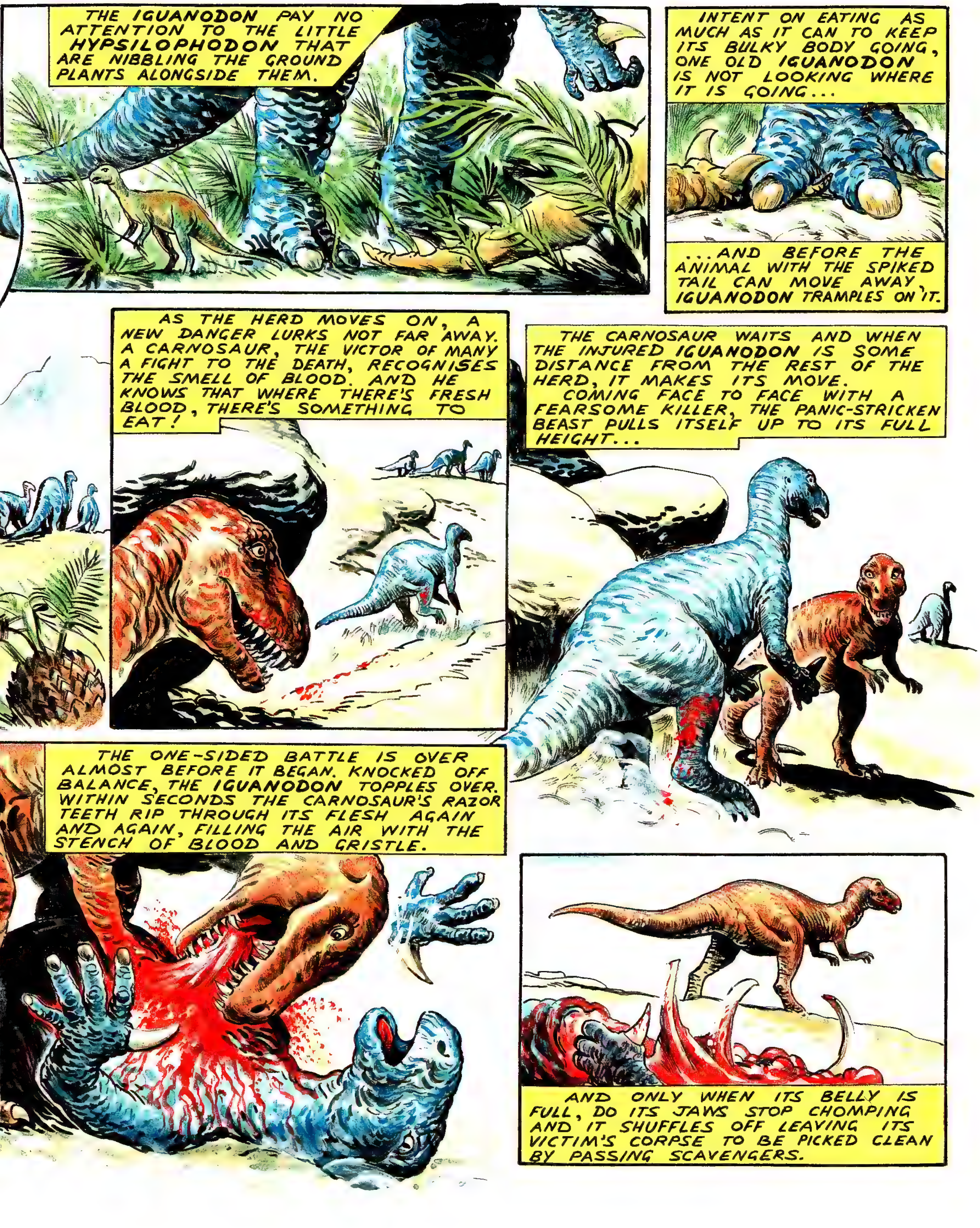
When *T rex* was first discovered, scientists did not know the exact age of the Earth or what animals lived when. Some thought *T rex* was just a few million years old. Some people even thought it might have eaten elephants.



Experts believe that the female *T rex* was bigger and stronger than the male. In most other species, such as elephants and tigers, the male is stronger and bigger than the female.

A DAY IN THE LIFE OF IGUANODON


A HERD OF IGUANODON IS MUNCHING THE FERNS THAT DOMINATE THE CRETACEOUS LANDSCAPE IN WHAT IS NOW NORTHERN EUROPE. THEY MAY LOOK FEROCIOUS, BUT THESE HUGE ANIMALS ARE PLACID PLANT-EATERS. PLACID, THAT IS, UNTIL THEY ARE ATTACKED.
IF THEY ARE ATTACKED THEY LASH OUT WITH THE FEARSOME SPIKED THUMB, WHICH CAN PIERCE THROUGH THE TOUGHEST SKIN OF THE MOST RUTHLESS CARNIVORE.
STARTLED, THE POLACANTHUS SPINS ROUND. ITS SHARPLY POINTED SIDE SPIKES CUT A DEEP GASH IN THE STUMBLING IGUANODON'S LEG.
SOMEHOW THE BADLY INJURED IGUANODON RIGHTS ITSELF.
IT LIMPS AFTER THE REST OF THE HERD, DESPERATE TO CATCH UP. FOR ON ITS OWN IT'S EASY PREY.
THE IGUANODON'S THUMB-SPIKES FLASH THROUGH THE AIR AS IT DESPERATELY TRIES TO MAIM ITS ASSAILANT.
BUT THE KILLER IS TOO QUICK FOR IT. WITH ONE LETHAL KICK, ITS CLAWED FOOT DIGS DEEP INTO THE IGUANODON'S ALREADY INJURED LEG.



THE IGUANODON PAY NO ATTENTION TO THE LITTLE HYPSILOPHODON THAT ARE NIBBLING THE GROUND PLANTS ALONGSIDE THEM.

INTENT ON EATING AS MUCH AS IT CAN TO KEEP ITS BULKY BODY GOING, ONE OLD IGUANODON IS NOT LOOKING WHERE IT IS GOING...

...AND BEFORE THE ANIMAL WITH THE SPIKED TAIL CAN MOVE AWAY, IGUANODON TRAMPLES ON IT.

AS THE HERD MOVES ON, A NEW DANGER LURKS NOT FAR AWAY. A CARNOSAUR, THE VICTOR OF MANY A FIGHT TO THE DEATH, RECOGNISES THE SMELL OF BLOOD. AND HE KNOWS THAT WHERE THERE'S FRESH BLOOD, THERE'S SOMETHING TO EAT!

THE CARNOSAUR WAITS AND WHEN THE INJURED IGUANODON IS SOME DISTANCE FROM THE REST OF THE HERD, IT MAKES ITS MOVE.

COMING FACE TO FACE WITH A FEARSOME KILLER, THE PANIC-STRICKEN BEAST PULLS ITSELF UP TO ITS FULL HEIGHT...

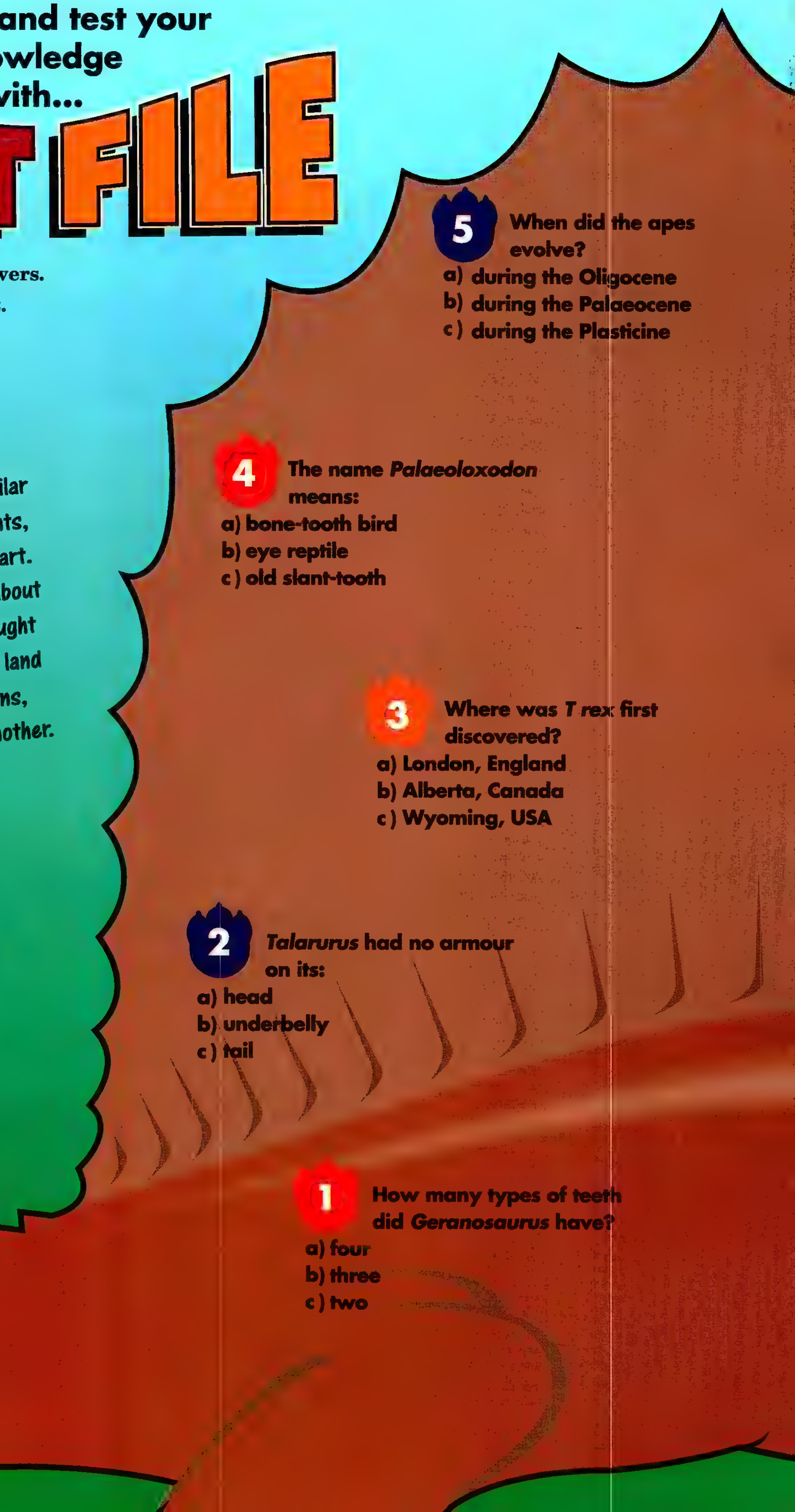
THE ONE-SIDED BATTLE IS OVER ALMOST BEFORE IT BEGAN. KNOCKED OFF BALANCE, THE IGUANODON TOPPLES OVER. WITHIN SECONDS THE CARNOSAUR'S RAZOR TEETH RIP THROUGH ITS FLESH AGAIN AND AGAIN, FILLING THE AIR WITH THE STENCH OF BLOOD AND GRISTLE.

AND ONLY WHEN ITS BELLY IS FULL, DO ITS JAWS STOP CHOMPING AND IT SHUFFLES OFF LEAVING ITS VICTIM'S CORPSE TO BE PICKED CLEAN BY PASSING SCAVENGERS.

Improve and test your knowledge with...

FACT FILE

Dimetrodon holds all the answers. See how you score in the quiz.



Long hikes

Sometimes we find very similar fossils on different continents, thousands of kilometres apart. Before people understood about continental drift, they thought that there must have been land bridges across the oceans, joining one continent to another.

You gotta have a heart

It has been estimated that the heart of a big sauropod could have weighed as much as a tonne. The huge size would be needed to propel the blood around the sauropod's massive body.

1 How many types of teeth did *Geranosaurus* have?
a) four
b) three
c) two

2 *Talarurus* had no armour on its:
a) head
b) underbelly
c) tail

3 Where was *T rex* first discovered?
a) London, England
b) Alberta, Canada
c) Wyoming, USA

4 The name *Palaeoloxodon* means:
a) bone-tooth bird
b) eye reptile
c) old slant-tooth

5 When did the apes evolve?
a) during the Oligocene
b) during the Palaeocene
c) during the Plasticine

Rhino graveyard

In Miocene Nebraska, USA, a herd of the short-legged rhinoceros, Teleoceras, was suffocated by a fall of volcanic ash.

6 *Tsintaosaurus* was:
a) a duckbilled dinosaur
b) a bird-hipped dinosaur
c) an ostrich-like dinosaur

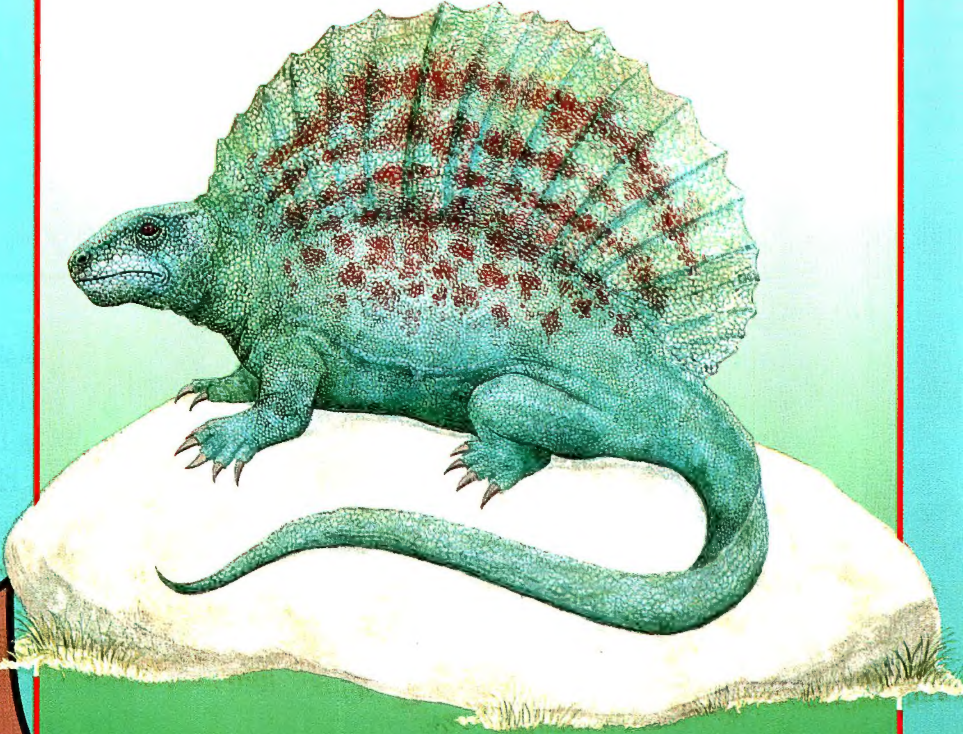
7 What was *T rex'* main weapon?
a) a massive, whip-like tail
b) a huge mouth with enormous teeth
c) gigantic, razor-sharp claws

8 Which animals flourished in the Tertiary Period?
a) the dinosaurs
b) the fishes
c) mammals and birds

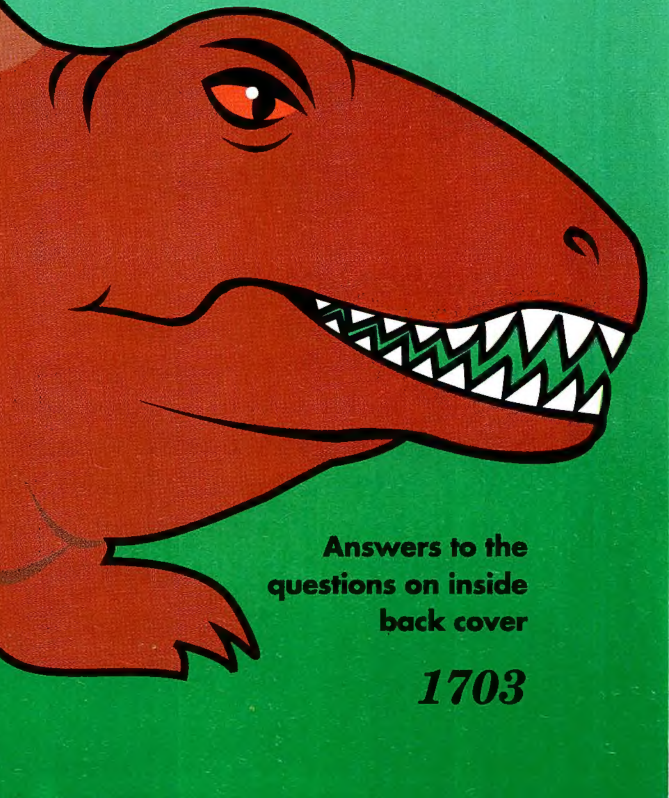
9 What was *Gomphotherium*?
a) an elephant
b) a lion
c) a dinosaur

10 *Youngina* became extinct:
a) before the dinosaurs
b) after the dinosaurs
c) at the same time as the dinosaurs

Tough teeth

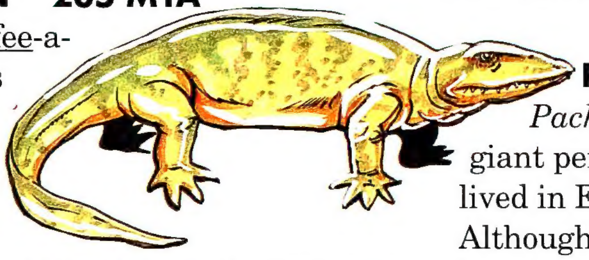


Edaphrosaurus was a plant-eating, sail-back reptile as long as a rhinoceros. It had blunt, peg-like teeth and tooth-plates in the roof of its mouth. With these, Edaphrosaurus would have been able to crush tough seed-fern leaves, and possibly even mollusc shells.



Answers to the questions on inside back cover

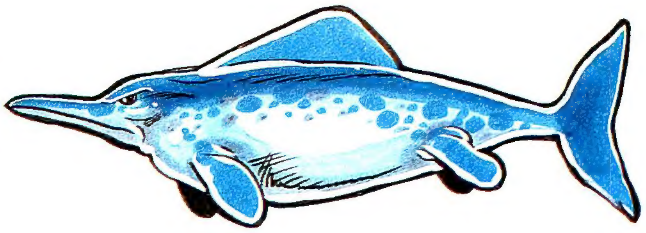
OPHIACODON 285 MYA



Ophiacodon (o-fee-a-koh-don) means 'snake teeth'. It was a mammal-like reptile that lived in Texas and New Mexico in the Early Permian. Its lizard-like body was as long as a small car. Compared to its body, *Ophiacodon*'s head was large and its deep, narrow jaws were lined with sharp teeth. It hunted fish and, possibly, small reptiles.

OPHTHALMOSAURUS 245 MYA

Ophthalmosaurus (off-thal-mo-saw-rus) was a Triassic ichthyosaur as long as a rhinoceros. It swam in the seas and rivers of France, Germany and England. It used its limbs like paddles to move its dolphin-shaped body through the water. *Ophthalmosaurus* means 'eye reptile'.



OSTEODONTORNIS 20 MYA

One of the largest flying birds so far discovered, *Osteodontornis* (oss-tee-oh-don-tor-niss) had a wingspan wider than two buses standing side by side. *Osteodontornis* glided above the water as it searched for food. Its long bill was lined with tooth-like spikes. Its name means 'bone-toothed bird'.

P

PACHYDYPTES 50 MYA

Pachydyptes (pak-ee-dip-teez) was a giant penguin as tall as a small human. It lived in Eocene times in New Zealand. Although it could not fly, *Pachydyptes* used its wings as flippers to propel it through the water when it swam.

PALAEOLOXODON 250,000 YA

The giant mammoth, *Palaeoloxodon* (pal-ee-oh-lox-oh-don), lived in the forests of Europe in Pleistocene times. It was more like the elephant of today than the woolly mammoth because it had very little hair. *Palaeoloxodon* had long, straight tusks that hung down on either side of its trunk. Dwarf species of *Palaeoloxodon*, which means 'old slant-tooth', lived on islands such as Malta.

PALAEOPHONUS
400 MYA

Palaeophonus (pal-ee-oh-foh-nus) was an early arthropod that lived in Silurian times. It was a scorpion and had eight legs, the first two carrying fearsome pincers, and a large sting on its tail. Very like a scorpion today, *Palaeophonus* may have been the first meat-eating animal on land.

MYA = MILLION YEARS AGO
YA = YEARS AGO

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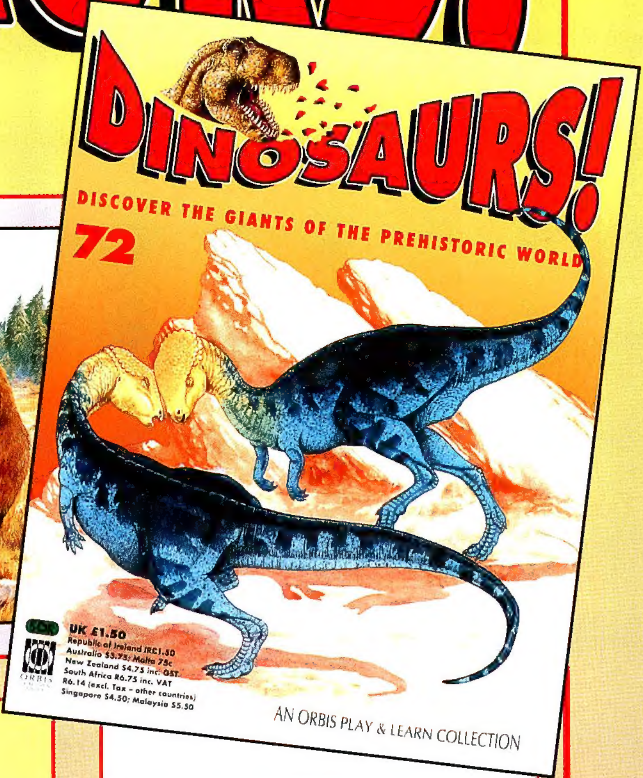
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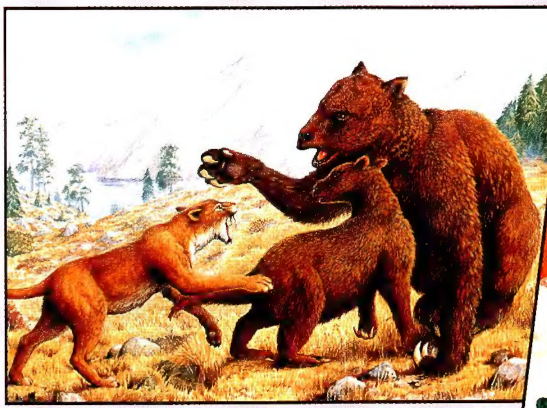

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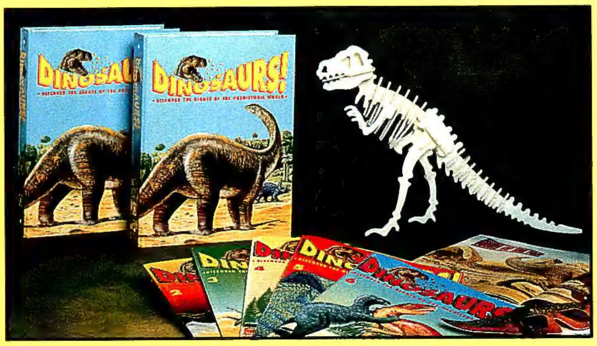

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ANSWERS TO FACT FILE QUESTIONS: 1.b 2.b 3.c 4.c 5.a 6.a 7.b 8.c 9.a 10.a

Dr David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

Was Archaeopteryx a dinosaur or a bird?

Archaeopteryx was a bird. This is because it had feathers. Today, only birds have feathers – it is one of their defining characteristics. If it is ever proved that some of the dinosaurs had feathers then we might have to rethink things. But, for the moment, feathers make a bird.

What happens to dinosaur names in other languages?

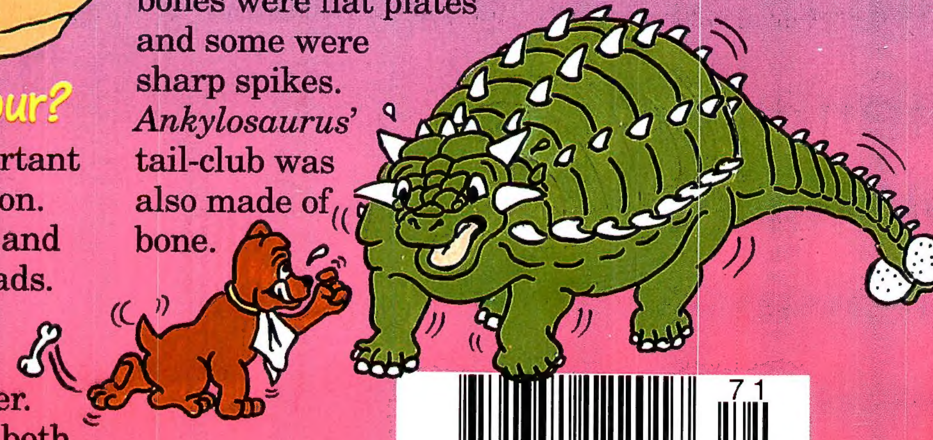
In most languages, dinosaur names stay the same. In languages such as Japanese and Russian, which use different alphabets, the names are transliterated, letter for letter, into the foreign language. This means they tend to sound similar to the way they sound in English. For example, 'hadrosaur' becomes 'gadrosavri' in Russian.

Could dinosaurs see in colour?

We know that visual clues were important in dinosaur-to-dinosaur communication. We can tell this from the large crests and frills some dinosaurs had on their heads. Lizards and birds, which do see in colour, use their brightly coloured bodies to communicate with each other. Dinosaurs share characteristics with both lizards and birds, so it is likely that some, if not all, dinosaurs could see in colour.

What was Ankylosaurus' armour made of?

Ankylosaurus' protective armour was made of solid pieces of bone. Some of these bones were flat plates and some were sharp spikes. *Ankylosaurus*' tail-club was also made of bone.



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